"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

KARMEN, K.N.

81962
S/181/60/002/04/22/034
B002/B063

24.7800

AUTHOR: Karmen, K. N.]

TITLE: The Effect of X-Rays Upon the Anomalous Properties of Rochelle Salt

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 4, pp. 679-684

TEXT: As was shown by the author in a previous paper (Ref. 1), an electric field has, in addition to its immediate action on the domains of spontaneous polarization, a shifting effect on lattice defects, which, in turn, influences the process of recrientation. This manifests itself in the slow change of the hysteresis loop. In order to confirm this assumption, the author subjected single crystals of Rochelle salt to X-radiation for different periods of time and determined the change in the hysteresis loop. Quadratic plates 0.4 - 1.0 cm thick were cut in such a way that the b- and c-axes formed the diagonals of the square. The plates were irradiated in stages (eight hours at most). The tube had a molybdenum anode and worked with 35 kv and 12 ma. Prior to the irradiation the plates had been polarized in a constant field for 1-2 weeks. The polarization

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was reduced by irradiation (Fig. 2). The hysteresis loop was considerably changed when the plates were polarized with an alternating or a constant field (Figs. 3 and 4) after irradiation. This state is, however, unstable. Piezoelectric properties are also considerably changed by irradiation (Fig. 6). There are 6 figures and 5 Soviet references.

ASSOCIATION: Shakhtinskiy gosudarstvennyy pedagogicheskiy institut (Shakhtino (Shakhty ?) State Pedagogical Institute)

SUBMITTED: September 28, 1959

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

Karmen, K. N.

82557

S/181/60/002/007/042/042
B006/B060

24.7800

AUTHOR: Karmen, K. N.

TITLE: The Effect of a Constant Electric Field on the Hysteresis of Rochelle Salt

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1671-1675

TEXT: With an experimental arrangement, whose circuit diagram is shown in Fig. 1, the author studied the effect of a constant electric field on specimens of Rochelle salt. The circuit is such as to allow an observation of hysteresis under the simultaneous action of a constant and a variable electric field on the specimen. A comparison of the hysteresis loops taken at $E_{=} = 0$ pointed to the existence of two types: symmetrical and unsymmetrical (Fig. 2). It could be established that only specimens with asymmetric hysteresis exhibit unipolarity, while those with symmetric hysteresis do not. From the hysteresis loops taken by an oscillograph it is possible to determine the amounts of polarizations which correspond to the amplitudes of the variable field. In the case of an unsymmetrical hysteresis (Fig. 3b) the distances of the turning points of the loop from the

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abscissa yield two different values: polarizations P_1 and P_2. Polarization $P_1 + P_2 = P_3$ ($P_r = 2P$ in the symmetrical case) proved to be a quantity quantitatively characteristic of the domain orientation. P_r is defined as polarization amplitude. If, now, a variable field is applied to the specimen in the same time as the constant field, and the sign of the constant field is reversed, P_r assumes then two different values in the unipolar specimens: the smaller one is designated with P_+, and the larger with P_-. In the non-unipolar specimens, P_r exhibits no variation with this pole reversal. Fig. 4 shows an example of the latter case for $V_= = +200$ v (a) and -200 v (b). The two loops are unsymmetrical, but one is the exact mirror image of the other. Fig. 5 shows the same for a unipolar specimen with large P_-/P_+ for $V_= = \pm 120$ v. The two loops show no similarity whatsoever. Further investigations of the influence of the duration of the constant field showed that the dielectric properties of Rochelle salt are strongly dependent on the time during which the specimen

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82557

The Effect of a Constant Electric Field on the Hysteresis of Rochelle Salt

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B006/B060

was exposed to the constant field. The ratio P_-/P_+ becomes equal to unity after a certain time. Fig. 6 shows such a case ($E_- < 0$): P_- decreases with time, P_+ rises, and after about 96 hours the ratio P_-/P_+ attains its reciprocal value. Fig. 7 shows $P_-(E)$ and $P_+(E)$. Polarization and depolarization take place practically at the same rate. An electric field thus entails at least two closely related processes on Rochelle salt, which however, have entirely different relaxation centers. There are 7 figures and 4 Soviet references.

ASSOCIATION: Shakhtinskiy gosudarstvennyy pedagogicheskiy institut (Shakhtino (Shakhty) State Pedagogical Institute)

SUBMITTED: January 31, 1960 (after revision)

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APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

KARMEN, K.N.

Effect of unipolarity on the electrical properties of Rochelle salt. Kristallografiia 6 no.3:426-431 My-Je '61. (MIRA 14:8)

1. Shakhtinskiy gosudarstvennyy pedagogicheskiy institut.
(Rochelle salt--Electric properties)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

KARMEN, K.N.

Polarization of ferroelectrics by short electric pulses.
Kristalografiia 8 no.5:729-732 S-O '63. (MIRA 16:10)

1. Novocherkasskiy inzhenerno-meliorativnyy institut.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

1. KARMEN, R.

2. USSR (600)

4. Main Turkmen Canal

7. Great construction project in the desert. Murzika no. 11, '52.

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

KARMEN, R., laureat Leninskoy premii

Salute to the "Seven-Year Plan in Action" exhibition; toward new achievements. Sov.foto 21 no.3:1-4 Mr '61. (MIRA 14:4)
(Photography--Exhibitions)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

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VLASYAN, Ye.S.; MANASERYAN, A.S.; KARMENYAN, V.N., redaktor; KAPLANYAN, M.A., tekhnicheskiy redaktor

[Bibliography of publications of the Armenian Branch of the Academy of Sciences of the U.S.S.R. and the Academy of Sciences of the Armenian S.S.R., 1936-1956] Bibliografiia izdanii ArmFANa i Akademii nauk Armianskoi SSR, 1936-1956 gg. Erevan, 1957. 353 p. (MLRA 10:9)

1. Akademiya nauk Armyanskoy SSR, Yerivan. TSentral'naya biblioteka (Bibliography)

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

KARMIL'CHIK, A. Ya. Cand Chem Sci -- "Decarbonylization of furfurole over oxide catalysers." Riga, 1961 (Acad Sci Latvian SSR. Inst of Forestry Problems and Chem of Wood). (KL, 4-61, 187)

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

Karmilov, A.G.

82648
S/126/60/010/02/020/020
E073/E335

21.6200

AUTHORS: Ibragimov, Sh. Sh., Karmilov, A.G. and Lyashenko, V.S.

TITLE: Investigation of the Influence of Fast Neutrons on the Characteristic Temperature of Iron and Copper

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol. 10, No. 2, pp. 316 - 317

TEXT: The authors studied the influence of a neutron field on the characteristic temperature of armco iron and electrolytic copper. Simultaneously, they determined the presence of type III distortions (disordered static displacements of atoms) in the crystal lattice and the microhardness of these metals. Determination of the characteristic temperature and of type III distortions was carried out by X-ray methods. 0.8 mm dia. wire specimens were irradiated inside three special aluminium containers in an experimental reactor BR-2 at temperatures between 40 and 70 °C. The aluminium containers were arranged in the reactor in such a way that for an equal fixed time the individual specimens received differing quantities of total radiation. Prior to placing in the reactor, the specimens were vacuum annealed (10^{-4} mm Hg) for 30 min at 650 °C (copper) and 760 °C (Fe). After irradiation the

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Investigation of the Influence of Fast Neutrons on the Characteristic Temperature of Iron and Copper

specimens were held for a certain time for the purpose of reducing the degree of radioactivity. The X-ray diffraction patterns in the irradiated and non-irradiated specimens were produced in a low-temperature chamber at room temperature and at liquid-nitrogen temperature, using molybdenum irradiation. The results are entered in a table on p 317 and it can be seen that irradiation with a total dose of 1.4×10^{19} n/cm^2 does not produce any change in the characteristic temperature of iron, whilst for copper a slight decrease in the characteristic temperature was observed after irradiation with total doses of 0.70×10^{19} and 1.4×10^{19} n/cm^2, which is almost within the limits of experimental error. To arrive at unequivocal results, further experiments with stronger radiation doses are required. The presence of type III distortions in irradiated iron and copper was observed, the magnitude of which depends on the radiation dose. Furthermore, anisotropy and a tendency to saturation were observed. Comparing the microhardness and the static displacement of atoms, it can be seen that there is an analogy in these changes expressed as a function of the integral radiation

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Investigation of the Influence of Fast Neutrons on the Characteristic Temperature of Iron and Copper

dose. It can be assumed that an increase in hardness of the investigated metals, as a result of neutron bombardment, is partly due to the formation of type III distortions. This assumption is in agreement with published work (Ref. 5) on the study of the annealing of irradiated metals and determination of the activation energy of defects which lead to hardening of iron. There are 1 table and 5 references: 3 Soviet, 1 English and 1 international.

SUBMITTED: November 9, 1959, originally,
January 14, 1960, after revision.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

GRIBANOV, Yu.I.; KARMILOV, A.G.; LEDNEV, I.A.

Equipment for the X-ray analysis of radioactive materials. Met. i metalloved. chist. met. no. 4:228-242 '63. (MIRA 17:5)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

GRIBANOV, Yu. I.; KARMILOV, A.G.; LEDNEV, I.A.

Electronic angle marker for the URS-501 X-ray apparatus. Prib. i tekh. eksp. 8 no.5:219-220 S-O '63. (MIRA 16:12)

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

L 15562-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD

ACCESSION NR: AP3004588 S/0126/63/016/001/0040/0043

AUTHORS: Ibragimov, Sh. Sh.; Karmilov, A. O.

TITLE: Properties of iron irradiated by neutrons

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 1, 1963, 40-43

TOPIC TAGS: iron, neutron irradiation

ABSTRACT: The effect of fast neutron irradiation on certain characteristics of commercial iron has been studied. The composition of the iron samples was (in % by weight): C- 0.04; Mn- 0.017; Si- 0.06; Ni- 0.038; Cr-0.017. The samples were subjected to neutron irradiation (integral doses: 1.4×10^{16} to 1.8×10^{20} of fast neutrons per 1 cm^2) at temperatures of 40-70C. They were then analyzed by x-ray and their electrical resistivity and microhardness were determined. It was established that neutron irradiation causes an increase in the hardness, in electrical resistivity, and in the space lattice parameters. The broadening of the (110) and (220) x-ray lines took place when the irradiation doses were large. Irradiation doses of 3×10^{19} n/cm^2 caused the most intensive variation in hardness and electrical resistivity, while further increase in dosage produced

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L 15562-63

ACCESSION NR: AP3004588

only insignificant changes in these properties. The variation in lattice parameter reached its maximum at the dose 5-7 x 10^{19} n/cm^2. The authors conclude that the effects observed can be explained from the standpoint of the formation of vacancies and the accumulations of displaced atoms. "The authors express their gratitude to S. T. Konobeyevskiy for the discussion of the results". Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 09Aug62 DATE ACQ: 27Aug63 ENCL: 00

SUB CODE: ML NO REF SOV: 004 OTHER: 006

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APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

SLAVUTSKIY, L., inzh.; KARMILOV, S., inzh.; RASS, F., inzh.

Using plastics in making wall panels. Zhil. stroi. no.11:13-16 N '60. (MIRA 13:11)

(Plastics) (Walls)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

KARMILOV, S.S.; MALININ, B.N.

Enclosing elements made of aluminum and plastics. Prom. stroi. 39 no.11:20-25 '61. (MIRA 14:12)

1. TSentral'nyy nauchno-issledovatel'skiy institut stroitel'nykh konstruktsiy Akademii stroitel'stva i arkhitektury SSSR (for Karmilov). 2. Proyektstal'konstruksiya (for Malinin).
(Building materials—Testing)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

ACCESSION NR: AT4008767 S/2804/63/000/024/0146/0194

AUTHOR: Freydin, A. S. (Candidate of technical sciences); Orlova, L. B. (Engineer); Oves, V. I. (Engineer); Karmilov, S. S. (Engineer)

TITLE: Synthetic adhesives for bonding aluminum alloys to aluminum alloys, plastics, and other materials

SOURCE: ASiA SSSR. Institut stroitel'ny*kh konstruktsiy. Trudy*, no. 24, 1963. Tekhnologiya izgotovleniya kleyeny*kh paneley iz plastmass, alyuminiya, asbestotsementa i betona, 146-194

TOPIC TAGS: adhesive, synthetic adhesive, phenolic adhesive, epoxy adhesive, rubber adhesive, bonding, aluminum alloy, aluminum alloy bonding, foamed plastic bonding, honeycomb plastic bonding, surface treatment, adhesive bonding strength, adhesive shearing test, adhesive stripping test, artificial aging, natural aging, aging thermal stability, long time strength, waterproofness, plastic adhesive, glue, rubber adhesive, water repellency

ABSTRACT: Adhesives have been selected and evaluated for use in three-layer wall and roof panels. Because of their favorable technological, physical and mechanical characteristics, phenolic, epoxy and rubber [illegible]

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ACCESSION NR: AT4008767

attention. A great variety of native and foreign ingredients were used in experimental compositions. Shearing and stripping tests were basic in evaluating the compositions. Bonding aluminum to aluminum, to foamed plastics, to honeycomb plastics, and to fiberboard sheets was discussed. Most of the examined adhesives showed both advantages and deficiencies and no definite recommendations have been made. Larger-scale mechanical tests have also been conducted on three-layer construction specimens to bring testing closer to real conditions. Artificial and natural aging, thermal stability, waterproofness and water repellency, long-time strength and creep have been examined. Testing procedures, particularly for ultimate stress, have been established. Soviet-made ingredients involved in the tests include ED-6, ED-5, EDF-3, EDF-1, EDF-13, EDF-11, EPF epoxy resins, PS-1, PS-4, PKhV, PSB foamed plastics and FE-5, FE-10, FRE-10, EPTs-1, EPTs-2, EORTs, EOSTs-1, EOSTs-2 adhesives. A new adhesive composition is suggested, designated KS-1, which is equal or superior in aging thermal stability to others. The composition of this and some other adhesives are given. Most results of the work are of preliminary character. "N. M. Belousova, A. A. Karpova, L. A. Khvenchuk, A. Ye. Gorenkova, M. I. Romadina and Yu. G. Korabel'nikov also took part in the work." Orig. art. has: 25 figures and graphs, and 9 tables.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

ACCESSION NR: AT4008767

ASSOCIATION: Institut stroitel'ny*kh Konstruktsiy, AS1A SSSR (Institute of Building Materials, AS1A SSSR)

SUBMITTED: 00	DATE ACQ: 17Jan64	ENCL: 00
SUB CODE: MT	NO REF SOV: 011	OTHER: 001

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

FREYDIN, A.S., kand.tekhn.nauk; ORLOVA, L.B., inzh.; OVES, V.I., inzh.; KARMILOV, S.S., inzh.

Synthetic glue for gluing aluminum alloys together with plastics and other materials. Trudy TSNIISK no.24:146-194 '63. (MIRA 17:1)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

VAKHURKIN, V.M.; GLADSHTEYN, L.I.; KARMILOV, S.S.; KLIMOV, S.A.; LEVITANSKIY, I.V.; MALININ, B.N.; NOSOV, A.K.; PAL'M, Yu.A.; POLYAK, V.S.; POPOV, G.D.; RASSUDOV, V.M.; KRASYUKOV, V.P.; SOKOLOV, A.G.; Prinimali uchastiye: GORBATSKIY, Ye.I.; MATVEYEV, S.S.; STRELETSKIY, N.S., prof., retsenzent; MUKHANOV, K.K., dots., retsenzent; BOLOTINA, A.V., red.; MIKHEYEVA, A.A., tekhn. red.

[Light-weight supporting metal structures] Oblegchennye nesushchie metallicheskie konstruktsii. Moskva, Gosstroiizdat, 1963. 282 p. (MIRA 17:2)

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

S/804/62/000/011/005/005

AUTHOR: Karmilov, S.S., Engineer.

TITLE: Investigation of the mechanical properties of honeycomb plastics

SOURCE: Akademiya stroitel'stva i arkhitektury SSSR. Institut stroitel'nykh konstruktsiy. Trudy. no.11. Moscow, 1962. Issledovaniya konstruktivnykh plastmass i stroitel-nykh konstruktsiy na ikh osnove. pp. 407-419.

TEXT: The paper describes tests intended to determine the usability of honeycomb plastics (HP) as the central layer of glued 3-layer panels for various building purposes. The mechanical properties of various paper- and cloth-based HP were explored. The HP were machine-made at the Scientific Research Institute for Plastics. In actual building practice the HP is subjected to compression and tension in a plane perpendicular to that of the outer covering and to shear in a plane parallel to the covering. Tests were, therefore, performed in compression, tension, and shear. 3 types of HP's were tested: (1) HP employing impregnated insulating paper ИП-63 (IP-63), impregnated with МФФ (MFF) resin, with cells 25 mm in size and a unit weight of 24 kg/m^3, and with cells 12 mm in size and a weight of 30 kg/m^3; (2) HP made of Kraft paper impregnated with carbamide

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resin with 12-mm cells having unit weights of 60 and 90 kg/m^3; (3) HP made out of cotton fabric impregnated with the phenol resin P-21 (R-21) with 12-mm cells and a weight of 145 kg/m^3. HP blocks 100x100x100 mm were used for compression and tension tests, 10x50x50 mm in shear tests, and 80x100x100 mm in shear-modulus tests. In all tests the HP was protected by top and bottom plates of Al-alloy АМг (AMg) bonded with the epoxy adhesive ЭПЦ-1 (EPTs-1). Compression tests: Photos of characteristic specimen failures are shown, also stress-strain diagrams on which the compressive modulus of elasticity (ME) was taken on a straight-line portion that comprised 4 or 5 loading steps; otherwise along the initial straight-line portion prior to the sudden steepening of the curve. Tension tests: Tension was applied in a direction perpendicular to the plane of the outer layer. Additional 10-mm thick load-application plates made of steel were bonded onto the Al plates, and the tension was applied to the steel plates. The character of the two paper HP's tested is approximately the same, with only the difference that the Kraft-paper HP exhibits a higher tensile strength and a higher ME in tension. Photos of failed specimens are shown. Shear tests: The shear tests were made in a direction parallel to that of the plane of the outer surfaces. The test equipment used was similar to that employed in shearing tests made on glued joints in wooden structures, with rollers employed to ensure pure shear stresses. The shear tests were performed in two mutually perpendicular directions,

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parallel and perpendicular to the glued sides of the HP cells, to determine the anisotropy of the strength characteristics of the HP. The specimen failures were characterized by the appearance of fissures, formed at an angle of 45° to the plane of the outer surface, i.e., along the line of action of the tensile stresses. Failure data were scattered about 36-40%, a fact that is attributed to the nonuniformity of the impregnation of the HP. The difficult problem of the choice of a suitable specimen shape led to the adoption of the specimen designed and described by Aleksandrov, A. Ya., et al., in Raschet trekhsloynykh konstruktsiy (The design of 3-layer structures), Oborongiz, 1960, and Aleksandrov's analytical formulas are used for the test evaluation. Additional account was taken of the irregular, not strictly hexagonal, shape of the cells encountered in industrial machine-made HP. The shear-test data are shown in a full-page table. Long-term (LT) tests of HP: LT tests with a constant load were made to obtain the LT ME and to obtain the LT strength factor of the HP. The HP is assumed to be subjected primarily to compression, and tests at a stress level of from 0.25 to 0.6 of the failure stress were performed. 3-4 specimens, 10x10x10 cm, were tested for the cotton-based HP and specimens 5x5x5 cm for Kraft-paper-based HP, with Al plates 1-mm thick glued to the outer surfaces. Crank-type presses of the Tonindustry-type and presses developed by the Central Scientific Research Institute for Building Construction were used. The deformation curve of the specimen with a unit weight of

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145 kg/m^3 exposed to a load of 0.285 that of failure indicates that the deformation in the 115-day test decreased substantially after about 50 days. In summary: The tests showed that the strength characteristics of HP improve with decreasing cell size. The paper-based HP samples differ little in unit weight, and their compressive strength is almost twice as great with the half-size cells. HP's with a given cell size gain in strength as the unit weight increases. Thus, the amount of HP base material used can be minimized by increasing the size of the cells somewhat with simultaneous more intensive impregnation of the cells with cheap resins. In actual building practice HP panels are so installed that the shearing stresses are applied in the perpendicular sense in which they are weaker than in the parallel sense. It is advantageous to let stiffening ribs take up the shear and to permit the 3-layer panels to work primarily in compression and tension. The IP-63 HP impregnated with MFF resin was found to be brittle and fragile. It crumpled during sawing, its edges are rough, and its use for building purposes cannot be recommended. The Kraft-paper-based and carbamide-resin-impregnated HP has fairly elevated strength and can be used for wall panels with a unit weight of 60 kg/m^3 and for roof panels with a weight of 90 kg/m^3. The cotton-based HP impregnated with phenol resin R-21 exhibits elevated strength and elasticity and can, therefore, be used for highly stressed structural members, multi-span panels, shell elements, etc. There are 11 figures, 1 table, and the

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Investigation of the mechanical properties ... S/804/62/000/011/005/005

1 Russian-language Soviet reference cited in the abstract.

ASSOCIATION: None given.

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APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

GUBENKO, A.B., doktor tekhn.nauk; KARMILOV, S.S., inzh.; RASS, F.V., inzh.; CHAPSKIY, K.A., inzh.

Glued three-layer slabs made with plastic. Trudy TSNIISK no.11:64-224 '62. (MIRA 15:9)
(Plastics)
(Laminated materials)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

KARTSEV, V.I.

Physics - Experiments

Experiments with colophony., Fiz. v shkole, No. 1, 1952.

Monthly List of Russian Accessions, Library of Congress, March 195[illegible]. UNCLASSIFIED.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

KARMILOVA, L.I.

AUTHOR: Karmilova, L.I., Engineer 28-1-12/42

TITLE: Thread Run-Out (Vykhod rez'by)

PERIODICAL: Standartizatsiya, # 1, Jan-Feb 1957, p 49-50 (USSR)

ABSTRACT: Information is given on the new All-Union standard "ГОСТ 8234-56" for cylindrical and taper-shaped pipe thread and acme thread profiles, and thread run-out dimensions. The standard will be put into effect on 1 July 57. It supercedes the "ОСТ НКТМ 1714-39". The new standard includes dimensions of thread run-outs and thread groovee, which are based on the metric-thread pitch and the thread numbers of taper inch-thread with 60° profile. This will eliminate the possibility of prescribing different groove-widths for threads of different diameters and equal lead. The standard gives three types of grooves for general and for special parts. The chamfers are 45° (instead of the former 60°)

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28(3); 25(2) SOV/28-59-4-12/19

AUTHOR: Karmilova, L.I., Engineer

TITLE: Double-Action Presses (Pressy dvoynogo deystviya)

PERIODICAL: Standartizatsiya, 1959, Nr 4, p 28 (USSR)

ABSTRACT: Brief information is given on the contents of "GOST 9034-59" standard for the basic parameters and dimensions of single-crank double-action open presses. Approved in February 1959 the Gost was developed on the basis of investigations done by the Tsentral'noye Byuro kuznechno- pressovogo mashinostroyeniya ("TsBKM") (Central Bureau of Forging-and-Pressing Machine Building) and other organizations. The new "GOST" will be in force from 1 January 1960 on. It standardizes the work pressures, work travel lengths, etc., makes possible the use of automatic feed, and creates the preconditions for extensive "unification" (standardization) of separate major components and parts of presses and dies.

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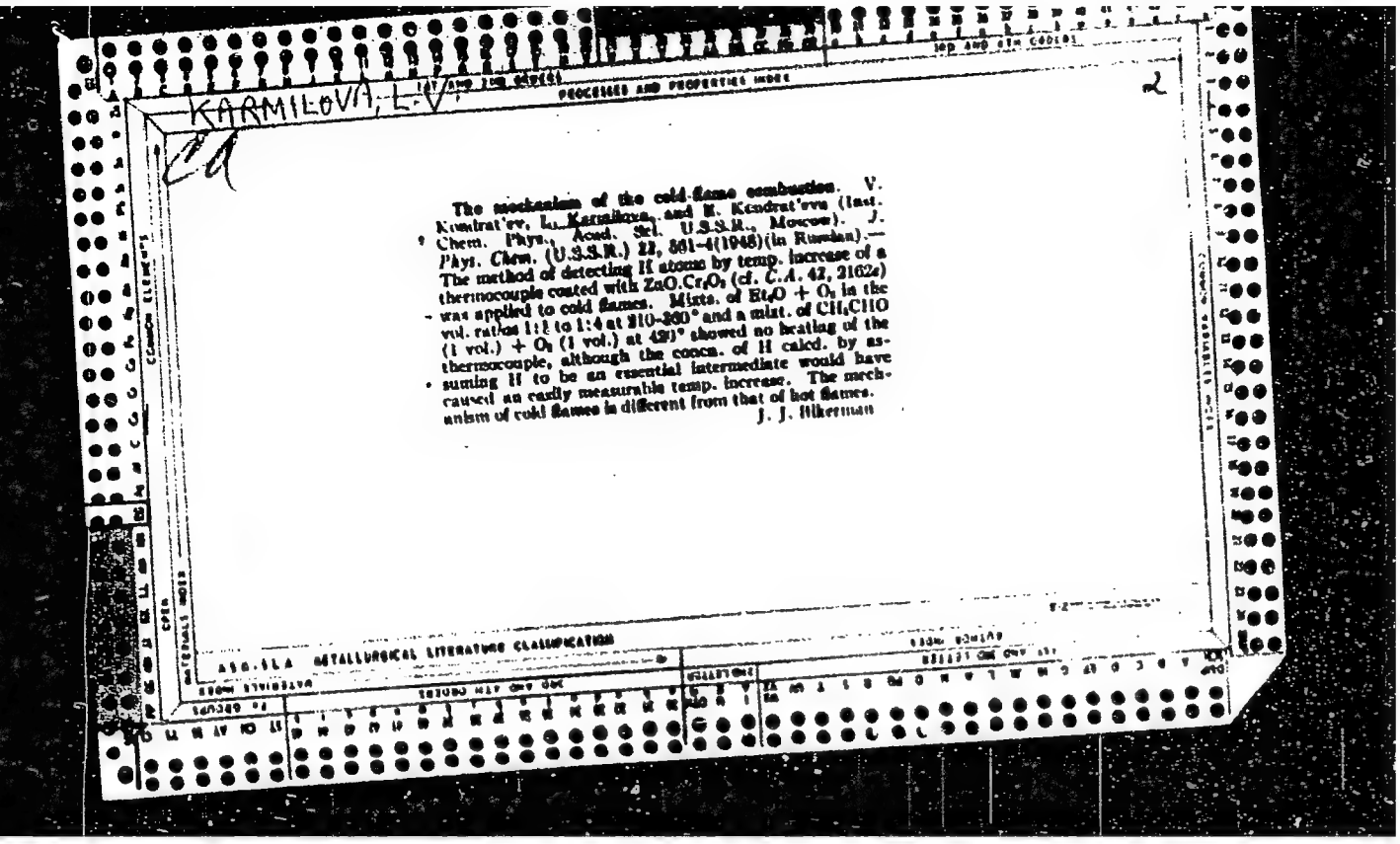

KARMILOVA, L.V.

Ed

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The mechanism of the cold-flame combustion. V. Kondrat'ev, L. Karmilova, and E. Kondrat'eva (Inst. Chem. Phys., Acad. Sci. U.S.S.R., Moscow). J. Phys. Chem. (U.S.S.R.) 22, 881-4(1948)(in Russian).—The method of detecting H atoms by temp. increase of a thermocouple coated with $ZnO.Cr_2O_3$ (cf. C.A. 42, 2162e) was applied to cold flames. Mixts. of $Et_2O + O_2$ in the vol. ratios 1:1 to 1:4 at 310-360° and a mixt. of CH_3CHO (1 vol.) + O_2 (1 vol.) at 49° showed no heating of the thermocouple, although the concn. of H calcd. by assuming H to be an essential intermediate would have caused an easily measurable temp. increase. The mechanism of cold flames is different from that of hot flames.

J. J. Elkerman

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CA KARMILOVA, L.V.

Measurement of the concentration of oxygen atoms in flames. L. V. Karmilova and V. N. Kondrat'ev (Acad. Sci. U.S.S.R., Phys.-Chem. Inst., Moscow). *Zhur. Fiz. Khim.* 25, 312-22(1951). Gaydon's suggestion to use the light output of the reaction $NO + O \rightarrow NO_2 + h\nu$ as a means of measuring the concn. of at. O in flames forms the basis of a quant. method, which is applied to CO-O_2 flames. The temp. of these flames is detd. by the Na *D*-line reversal method. Preliminary expts. with CO-air flames give temps. in agreement with those found earlier (Loomis and Perrott, *C.A.* 22, 4340). Since the temp. of CO-O_2 flames is too high for the optical pyrometer, an extrapolation is necessary; a linear relationship is found between the temp. T (in °K.) and $\sqrt{i}$, where i is the current passing through the filament of the lamp in the temp. measurement app. A straight line fitting exptl. data obtained between 1000 and 2250° K. is extrapolated to higher temps. The temp. of a CO-O_2 flame (stoichiometric mixt.) is thus 2730 ± 50°K. Addn. of NO (0.6 to 20%) decreases this temp. by 37° on the av. The light intensity I of the flame is detd. spectrophotometrically as the difference between I_1 in presence of NO and I_2 in its absence. Measurements are made at different wave lengths: 6507, 6207, 6030, 5764, 5562, and 5400 A., intensities are detd. microphotometrically, and abs. values obtained by comparison with a Heffner lamp. The values of T and I are used for calcg. the partial pressure p_0 of at. O in the flame. A reaction scheme is put forward (the k's are rate consts.): $NO + O = NO_2^*$ (k_1'); $NO + O + M_i = NO_2^* + M_i$ (k_{1i}'); $NO_2 + M_i = NO_2^* + M_i$ (k_{2i}'); $NO_2^* = NO + O$ (k_2); $NO_2^* + M_i = NO + O + M_i$ (k_{2i}); $NO_2^* + M_i = NO_2 + M_i$ (k_{3i}); $NO_2^* = NO_2 + h\nu^*$ (k). This mechanism (rate consts. for the reverse reactions without prime), gives: $I = k[\exp(-D/RT)[.10^8 Nh\nu^*][(\alpha + \Sigma\beta_i p_i)p_{NO}p_O/K_p] + \Sigma\gamma_i p_i p_{NO_2}]$ (1) $+ \alpha + \Sigma\beta_i p_i + \Sigma\gamma_i p_i)\rho_{NO}p_O/K_p$ erg/cc. sec. with $\alpha = k_1/k_2$, $\beta_i = k_{1i}10^8 N/kRT$, $\gamma_i = k_{2i}10^8 N/kRT$, $k_{1i}/k_{2i} = \exp(-E/RT)$, $E = D + RT$; $k_1'/k_1 = k_{1i}'/k_{2i} = (1/K_p)\exp(-E/RT)$. The value of D is 71.45 ± 0.50 kcal./mole. The values of k, α, β_i, γ_i, p_i and ν^* are found as follows. The fluorescence of NO_2 gives $k = 10^6$ sec.$^{-1}$ (N. Heil, *C.A.* 26, 5839). The values of γ_i are taken from Baxter's study of the quenching of NO_2 fluorescence (*C.A.* 25, 33). Data concerning the influence of foreign gases on the quantum yield of the photodecompn. of NO_2 (Holmes and Daniels, *C.A.* 28, 2620*) give the values of α and β_i. Further, p_i is obtained from the following relations giving av. pressures: $p_{CO_2} = x/(x + 2)$; $p_{CO} = x/2(x + 1)$; $p_{O_2} = 1 - p_{CO_2} - p_{CO}$; with $x = p_{CO}/p_{O_2}$. The max. emission of the NO_2 spectrum occurs at $\lambda^* = 600$ mμ; this gives ν^*. Finally, the term contg. p_{NO_2} in (1) is shown to be negligibly small because p_{NO_2} in the flame is much less than its equil. value p_{NO_2}': $(p_{NO_2}/p_{NO_2}') < 10^{-6}$. The value of p_O in the flame obtained from (1) can now be compared with the equil. value p_O' calcd. from thermodynamics and the ratio $(p_O/p_O') = P$ is plotted vs. the temp. T of the flame; a curve is obtained showing the decrease of P when T increases, e.g. $P = 1.25, 3.25, 5.75$ for $T = 2615, 2661, 2476$°K., resp. Of course, these data concern the CO-O_2 flame modified by the presence of NO.

M. Boudart

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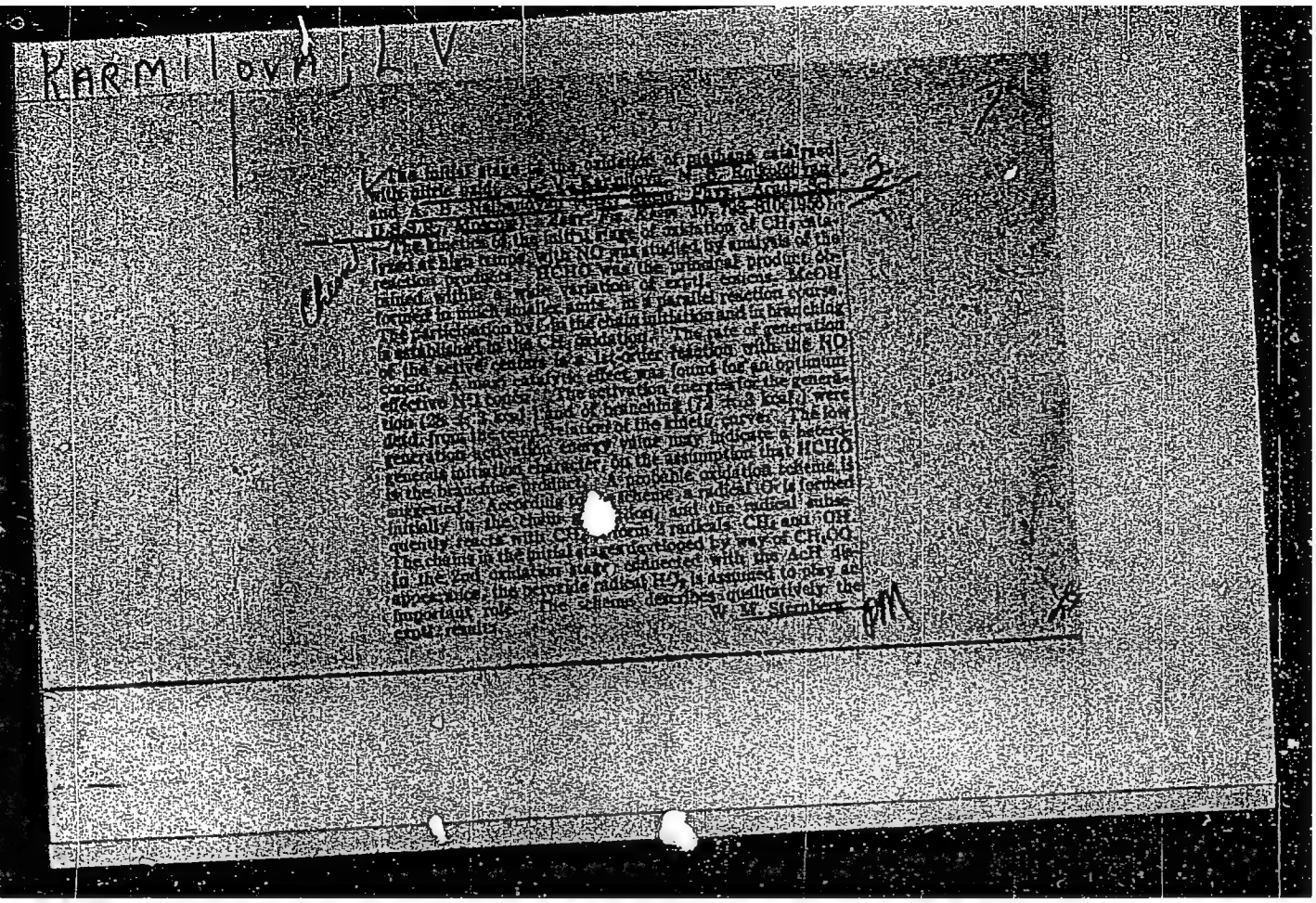

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SOV/ 76-32-6-1/46

AUTHORS: Karmilova, L. V., Nalbandyan, A. B., Semenov, N. N.

TITLE: An Investigation of the Combustion of Hydrogen with Oxygen Above the Lower Self-Ignition Limit (Issledovaniye kinetiki goreniya vodoroda s kislorodom nad nizhnim predelom samovosplameneniya)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, № 6, pp. 1193-1204 (USSR)

ABSTRACT: The process of low-temperature self-ignition and the kinetics of combustion can be classified in 5 stages of reaction, the summary velocity of the combustion of hydrogen being determined by the modification of the concentration of atomic hydrogen. For this process a differential equation by N. N. Semenov exists. As may be seen from a diagram, the relative concentration of atomic hydrogen reaches comparatively high values during reaction, thus disturbing the reaction between the pressure drop Δp and the consumption of substance. It was observed that the pressure drop is proportional to the combustion at low relative concentrations of atomic hydrogen.

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SOV/76-32-6-1/46

An Investigation of the Combustion of Hydrogen With Oxygen Above the Lower Self-Ignition Limit

E_q of the decomposition reaction was determined according to three different methods, all yielding identical results. Summarily, it can be stated on the strength of the evidence found that the maximum of reaction velocity is shifted to the range of low combustion with a reduction of $R = 2p_1/p_0$. This can be explained with the above mentioned phenomenon of the increase of concentration of hydrogen atoms. There are 12 figures, 4 tables, and 15 references, 9 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut khimicheskoy fiziki, Moskva (Moscow, Institute of Chemical Physics, AS USSR)

SUBMITTED: December 30, 1957

1. Hydrogen--Combustion 2. Combustion--Velocity
3. Oxygen--Chemical reactions 4. Mathematics

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SOV/80-32-4-38/47

5(3)

AUTHORS: Yenikolopyan, N.S., Kleymenov, N.A., Karmilova, L.V., Markevich, A.M. and Nalbandyan, A.B.

TITLE: The Preparation of Formaldehyde in a Jet Apparatus by Means of the Oxidation of Methane Catalyzed by Nitrogen Oxides (Polucheniye formal'degida na struyevoy ustanovke putem okisleniya metana, katalizirovannogo okislami azota)

PERIODICAL: Zhurnal prikladnoy Khimii, 1959, Vol 32, Nr 4, pp 913-919 (USSR)

ABSTRACT: The problem of methane oxidation, very important in view of chemical utilization of natural gases, was dealt with in many investigations, including those of Medvedev [Refs 25, 26] and D.M. Rudkovskiy. The present article describes some results of laboratory studies in obtaining formaldehyde by means of methane oxidation catalyzed by nitrogen oxides. The following research workers of the VNIIGAZ MNP participated in individual phases of these studies: S.A. Anisonyan, S.Ya. Beyder, and N.I. Vinnikova, and of the Giprokauchuk MKhP: A.S.Zhadayev, N.N. Chernov and M.N. Shendrik. The methane oxidation was carried out under jet conditions at a pressure of the gas mixture near the atmospheric one and at temperatures of 600 to 800°C. Various conditions of experimentation were tried out in order to find the optimum ones, and the results were as follows: 1. The treatment of the inner surface of

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The Preparation of Formaldehyde in a Jet Apparatus by Means of the Oxidation of Methane Catalyzed by Nitrogen Oxides

a vessel, in which reactions take place, with $K_2B_4O_7$ increases and stabilizes the yield of formaldehyde and reduces the reaction temperature by 80 or 100°C; 2. The relative yield of formaldehyde (CH_2O : NO) amounts to 10 to 12 molecules per one molecule of the catalyst; 3. The optimum composition of the methane-air mixture was found to be 1 : 2; 4. The optimum temperature of the reaction is about 100°C; 5. The stable run of the reaction is possible in metal vessels; 6. The laboratory results were confirmed by experiments carried out in a pilot installation with a capacity of 13 m^3/hr of gas-air mixture. There are 7 graphs and 35 references, 16 of which are Soviet, 14 English , 2 German, 1 Swiss, 1 French and 1 Japanese.

SUBMITTED: September 30, 1957

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

5(3) SOV/80-32-5-35/52

AUTHORS: Yenikolopyan, N.S., Kieymenov, N.A., Karmilova, L.V., Markevich, A.M., Nalbandyan, A.B.

TITLE: The Preparation of Formaldehyde by Methane Oxidation Reaction Catalyzed by Nitrogen Oxides

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol 32, Nr 5, pp 1132-1135 (USSR)

ABSTRACT: The preparation of formaldehyde in reaction vessels installed in line and also by the method of recirculation is investigated here. In one series, the gas-air mixture of 33.3% CH_4, 66.6% air and 0.1% NO was passed through reaction vessels. The formaldehyde was separated by water in absorbers. It has been shown that under these conditions 7.4% of methane is oxidized to formaldehyde and 9 - 12% to carbon monoxide. In the closed circulation method the mixture was passed many times through the reaction vessel. After 8 cycles 18.5% of methane is oxidized to formaldehyde and 19.7% to carbon monoxide. An additional supply of air or oxygen increases the yield to 32%. The yield of formaldehyde per 1 molecule of NO is 20 and even 30 molecules at 550 and 590°C. In the continuous circulation method the mixture is continuously supplied with fresh gas. The temperature varies from 565 - 680°C. NO was supplied

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

The Preparation of Formaldehyde by Methane Oxidation Reaction Catalyzed by Nitrogen Oxides

to keep the concentration at 0.1 volume %. After 10 circulations 21% of methane is converted to formaldehyde. The losses of NO due to absorption in the absorber amount to 2-16%. It has been found that NO is not consumed in the reaction.
There are 3 graphs, 1 table and 2 Soviet references.

SUBMITTED: September 30, 1957

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S/076/60/034/03/009/038
B115/B016

AUTHORS: Karmilova, L. V., Yenikolopyan, N. S., Nalbandyan, A. B. (Moscow)

TITLE: Kinetics and Mechanism of Methane Oxidation. I. Fundamental Macrokinetic Rules

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 3, pp 550 - 558 (USSR)

TEXT: The papers by N. N. Semenov (Refs 1,2) dealing with the oxidation processes of hydrocarbons are mentioned. In the present paper the results of a thorough investigation of the kinetics and composition of the oxidation products of methane during the entire course of reaction in a vessel with exactly prescribed type of surface are given. The rules in the accumulation of intermediates (CH_2O and H_2O_2), some new phenomena in methane oxidation, and the probable mechanism of the process will be dealt with in the following publications of this series. The experiments were carried out in a static device already previously described (Ref 4). To analyze the formaldehyde and hydrogen peroxide a calorimeter of the type FEK-M was used. The experiments were made in a temperature range of from 423 to 513°C, in a pressure range of from 117 to 375 torr, and at ratios of $CH_4:O_2$ = 0.5; 1 and 2 (Figs 1-3), in which connection the

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Kinetics and Mechanism of Methane Oxidation.
I. Fundamental Macrokinetic Rules

accumulation of reaction products (CO, CO_2, H_2, H_2O) was pursued. The reaction kinetics in dependence on temperature (Fig 4), and the influence exercised by the composition of the initial mixture and initial pressure upon the kinetics of methane oxidation (Figs 5,6) were pursued. It is pointed out that the maximum rates of the consumption of initial reagents and accumulation of end products of the reaction in the temperature range investigated are in agreement with the stoichiometric ratios. The activation energy of methane oxidation is 41.5 ± 1 kcal/mole. The dependence of the maximum rate of methane consumption on the initial pressure of the reaction mixture and its logarithmic anamorphosis is pursued (Fig 7). The degree of the completeness of the reaction of methane oxidation ($n = 2.7$), the reaction degree for methane ($\alpha = 1.62$), and that for oxygen ($\beta = 0.96$) at a total pressure of $\gamma \approx 0.1$, were determined (Figs 8,9). The dependence of the induction period on the pressure of the initial mixture and its logarithmic anamorphosis are given (Fig 10). The temperature coefficient ($E_{\tau i} = 36 \pm 1$ kcal/mole) was also determined. The student V. T. Il'in also assisted in this investigation. There are 10 figures and 22 references, 10 of which are Soviet.

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AUTHORS: Karmilova, L. V., Yenikolopyan, N. S., Nalbandyan, A. B.

TITLE: Kinetics and Mechanism of Methane Oxidation. II. Kinetics of Accumulation of Intermediates

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 5, pp. 990-994

TEXT: The investigation under review was conducted with the participation of I. Yu. Uvarova. The authors studied the kinetics of accumulation of formaldehyde and hydrogen peroxide in the methane oxidation in a quartz vessel treated with HF. The influence of temperature was tested with a stoichiometric methane - oxygen mixture at 235 torr pressure and temperatures of 426, 472, 491.5, and 513°C (Figs. 1-4, kinetic curves). The analysis of the curves showed that formaldehyde appears as primary intermediate, while hydrogen peroxide is formed after longer contact times by oxidation of formaldehyde. The maximum concentration of formaldehyde rises with temperature, while that of hydrogen peroxide drops. The yield of hydrogen peroxide drops likewise with a rise in temperature. The activation energy of the formaldehyde formation amounts to $E_{(CH_2O)max}$=7.8±0.5 kcal.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

Kinetics and Mechanism of Methane Oxidation. II. Kinetics of Accumulation of Intermediates

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The maximum yield of formaldehyde increases in proportion to a rise in the initial pressure of the gas mixture. While the yield of hydrogen peroxide depends but little on the formaldehyde content in the mixture, the maximum yield of formaldehyde rises linearly with rising methane content in the gas mixture. With ratios $O_2 : CH_4 = 2$ to 0.86, the maximum yield of formaldehyde is independent of the oxygen content in the gas mixture, whereas in the case of $O_2 : CH_4 = 0.86$ to 0.128, CH_2O_{max} drops linearly with dropping oxygen partial pressure. A paper by A. M. Markevich is mentioned in the text. There are 11 figures and 13 references: 8 Soviet and 5 English.

SUBMITTED: June 5, 1958

Card 2/2

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B015/B061

AUTHORS: Karmilova, L. V., Yenikolopyan, N. S., Nalbandyan, A. B., Semenov, N. N. (Moscow)

TITLE: Kinetics and Mechanism of the Oxidation of Methane. III. Detailed Mechanism of the Reaction

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 6, pp. 1176-1185

TEXT: On the basis of the kinetic data and the modern conception of the energy of elementary reactions of radicals with stable molecules, a scheme of the most probable oxidation mechanism of methane in the gaseous phase is derived, with due consideration of the branch reaction of formaldehyde in the process. The oxidation mechanism can be represented to greater degrees of conversion by the following system of reactions: $CH_4 + O_2 \rightarrow \dot{C}H_3 + H\dot{O}_2$ (0) $\dot{C}H_3 + O_2 \rightarrow CH_2O + \dot{O}H$ (I)

$\dot{O}H + CH_4 \rightarrow H_2O + \dot{C}H_3$ (II) $\dot{O}H + CH_2O \rightarrow H_2O + H\dot{C}O$ (II')

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KARMILOVA, L.V.; YENIKOLOPYAN, N.S.; NALBANDYAN, A.B.

Kinetics and mechanism of methane oxidation. Part 4: Effect of hydrogen peroxide and water on the reaction kinetics. Zhur. fiz. khim. 35 no.5:1046-1053 My '61. (MIRA 16:7)

1. Institut khimicheskoy fiziki AN SSSR.
(Methane) (Oxidation)
(Chemical reaction, Rate of)

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KARMILOVA, L.V.; YENIKOLOPYAN, N.S.; NALBANDYAN, A.B.; IL'IN, V.T.
(Moskva)

Kinetics and mechanism of methane oxidation. Part 5: Constant rate of methane oxidation. Zhur. fiz. khim. 35 no.7:1435-1442 Jl '61. (MIRA 14:7)

1. Akademiya nauk SSSR, Institut khimicheskoy fiziki.
(Methane) (Oxidation)

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KARMILOVA, L.V.; YENIKOLOPYAN, N.S.

Kinetics and mechanism of methane oxidation. Part 6: Mechanism of carbon dioxide formation and the evaluation of the stationary state concentration of hydroxyl radicals in the reaction. Zhur. fiz. khim. 35 no.7:1458-1464 Jl '61. (MIRA 14:7)

1. AN SSSR, Institut khimicheskoy fiziki.
(Methane) (Oxidation) (Carbon dioxide)

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L 12984-63 EWP(j)/EPF(c)/EWT(m)/BDS ASD Pc-4/Pr-4 RM/WW
ACCESSION NR: AP3000517 S/0020/63/150/002/0309/0312

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64

AUTHOR: Dudina, L. A.; Karmilova, L. V.; Yenikolopyan, N. S.

TITLE: Oxidative destruction of polyformaldehyde

SOURCE: AN SSSR. Doklady, v. 150, no. 2, 1963, 309-312

TOPIC TAGS: thermal oxidative destruction, polyformaldehyde, depolymerization, activation energy, reaction rate

ABSTRACT: Thermal oxidative destruction of polyformaldehyde with hydroxyl or with acetylenic end groups was carried out at 180-185 degrees; condensed products were continuously collected and analyzed. Regardless of the end group, main products were monomeric formaldehyde (about 80-90%) and formic acid (5-8%), with traces of others, but no peroxides. The course of the O-initiated depolymerization and practical absence of oxidation reaction was studied. Activation energies and reaction rates were calculated for proposed reactions where the molecule can disintegrate as shown in equation (1) of enclosure 1, or it can add a molecule of O as shown in equation (2) of enclosure 1, then subsequently isomerize. However, peroxides were not detected: either they were not formed according to proposed reactions, or additional reactions, not calculated herein, are involved. Also none of the proposed reactions explains the formation of formic acid. Further study is recommended.

Card 1/3

Inst. of Chemical Physics

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T. 12335-63 EPR/EWP(j)/EPF(c)/EWT(m)/BDS AFFTC/ASD Ps-4/Pc-4/Pr-4 RM/WW
ACCESSION NR: AP3000753 S/0020/63/150/003/0580/0583 73 72

AUTHOR: Dudina, L. A.; Berlin, Al. Al.; Karmilova, L. V.; Yenikolopyan, N. S. 15

TITLE: Changing the molecular weight by oxidative destruction of polyformaldehyde

SOURCE: AN SSSR. Doklady, v. 150, no. 3, 1963, 580-583

TOPIC TAGS: oxidative destruction, polyformaldehyde

ABSTRACT: In continuation of earlier work by L. A. Dudina, L. V. Karmilova, and N. S. Yenikolopyan (DAN. 150, no. 2, 1963), a study was made to determine whether the O-initiated decomposition of polyformaldehyde does indeed go according to the equation shown in the enclosure. Experimentally a sharp drop in molecular weight was found, such that its dependence on the degree of conversion is representative of the formation of two stable fragments upon decomposition of the molecule. These fragments could be formed either because the O inhibits decomposition of the active center in addition to initiating destruction of the polymer or because of acidolysis of the polymer by the acid from the oxidation process. Calculations also indicated that the above-proposed reaction does not account for the drop in molecular weight. Orig. art. has: 1 figure and 28 equations.

Card 1/3/ Inst. of Chemical Physics

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L 15605-63 EPR/EWP(j)/EPF(c)/EWT(m)/BDS AFFTC/ASD Ps-4/Pr-4/Pc-4
RM/WW/JW

ACCESSION NR: AP3004703 S/0190/63/005/008/1160/1164

AUTHORS: Dudina, L. A.; Karmilova, L. V.; Yenikolopyan, N. S.

TITLE: Thermal and thermooxidative decomposition of polyformaldehyde. 4. Kinetics of the thermooxidative reaction

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 5, no. 8, 1963, 1160-1164

TOPIC TAGS: formaldehyde, polyformaldehyde, thermooxidative decomposition, autocatalysis, stabilization

ABSTRACT: The polymer (0.382 gms) was placed in a glass dish attached to a quartz spiral suspended inside a glass cylinder. Through this a stream of oxygen was passed at temperatures ranging from 165-220C. The changes in weight of the sample were followed by recording the extension of the spiral. The gaseous decomposition products, trapped by means of condensation at temperatures down to -80C, were analyzed for monomeric formaldehyde, organic peroxides, hydrogen peroxide, and formic acid. The viscosities of the samples were determined by Ubbelhode's method in dimethylformamide solution at 150C, and from it the molecular weights were calculated. It was found that the oxidative decomposition of

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L 15605-63

ACCESSION NR: AP3004703

2

nonstabilized polyformaldehyde proceeds at a rate nearly 50 times greater than purely thermal decomposition in an atmosphere of argon, formaldehyde being the only decomposition product. Also, in the oxidative process the molecular weight of the residual polyformaldehyde shows a nearly instant drop in molecular weight to $2.6 \cdot 10^3$ from an initial figure of $3 \cdot 10^5$, while in an atmosphere of argon the molecular weight is affected only slightly. Experiments with polyformaldehyde stabilized by means of acetic anhydride revealed a rapid slowing of the decomposition reaction and an insignificant drop in molecular weight. It is suggested that the polyformaldehyde decomposition process possesses autocatalytic characteristics. Orig. art. has: 6 charts.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Physical Chemistry, Academy of Sciences, SSSR)

SUBMITTED: 05Jan62 DATE ACQ: 28Aug63 ENCL: 00

SUB CODE: CH NO REF SOV: 005 OTHER: 002

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

L 15601-63 EPR/EWP(j)/EPF(c)/EWT(m)/BDS ASD Ps-4/Pc-4/
Pr-4 RM/WH/JW

ACCESSION NR: AP3004710 S/0190/63/005/008/1245/1249

AUTHORS: Dudina, L. A.; Agayants, L. A.; Karmilova, L. V.; Yenikolopyan, N. S.

TITLE: Thermal and thermooxidative decomposition of polyformaldehyde. 3. The role of formic acid in the thermooxidative reaction

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 5, no. 8, 1963, 1245-1249

TOPIC TAGS: thermal decomposition, thermooxidative decomposition, polyformaldehyde, formic acid, stabilization

ABSTRACT: Experiments were conducted using 0.382 gm of acetylated polyformaldehyde having a molecular weight of $0.7 \cdot 10^5$, which was subjected to vapors of 85% formic acid in a current of oxygen or argon, or to the acid alone. The kinetics of polyformaldehyde decomposition were recorded in an earlier paper by L. A. Dudina, L. V. Karmilova, N. S. Yenikolopyan (Vysokomolek. soed., 5, 1160, 1963). It was found that at 220C the rate of thermooxidative decomposition of polyformaldehyde in argon increases in proportion to the formic acid gas content and that an almost double rate and volume of destruction take place in the presence of oxygen. Where samples of polyformaldehyde were reacted with liquid 85%

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ACCESSION NR: AP3004710

formic acid previous to exposure to oxygen or argon, it was observed that at 202C the rate of decomposition in oxygen was tenfold that in argon. The volume of polyformaldehyde decomposition in argon did not exceed 4%, and the viscosity went down to only 0.62 from an original 0.68. It is concluded that formic acid reacts with polyformaldehyde so as to facilitate its subsequent thermooxidative decomposition by oxygen. Orig. art. has: 1 formula, 4 charts, and 2 tables.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, Academy of Sciences, SSSR)

SUBMITTED: 08Feb62 DATE ACQ: 28Aug63 ENCL: 00

SUB CODE: CH NO REF SOV: 002 OTHER: 001

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L 16371-65 EPA(s)-2/EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4/Pt-10
ACCESSION NR: AP4049145 WW/RM S/0190/64/006/011/1926/1930

AUTHOR: Dudina, L. A.; Zharova, T. E.; Karmilova, L. V.; Yenikolopyan, N. S. 15

TITLE: Kinetics of the thermooxidative degradation of polyformaldehyde

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 11, 1964, 1926-1930

TOPIC TAGS: polyformaldehyde, acetylated polymer, thermal degradation, oxidative degradation, polyformaldehyde degradation

ABSTRACT: The kinetics of the weight loss, decrease in molecular weight and formic acid accumulation during the thermooxidative degradation of polyformaldehyde (PFA) with acetyl and hydroxyl end groups were investigated over a temperature range of 160-230C, in the presence of O_2 of varying concentrations (3-100%). It was found that apart from initiating the degradation according to the random law, oxygen in low concentrations inhibits both the gas evolution and molecular weight diminution of PFA with hydroxyl end groups at temperatures above 160C. The kinetic curves of degradation are given for acetylated and nonacetylated polymers. The rate of oxidative degradation was found to depend considerably on the O_2 concentration. It is remarkable that at 180C, the kinetic curves of weight loss for the nonacetylated polymer during thermal degradation in argon were higher than the curves in the presence of small amounts of O_2. Analogous phenomena were observed with

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L 16371-65
ACCESSION NR: AP40 9145

the acetylated polymer and at higher temperatures (190-200C). The range of O_2 concentration in which the inhibitory effect of O_2 is higher than its initiating effect increases with increasing temperature. This was shown by diagrams plotted at different temperatures. For acetylated polymers, the rate of reaction increases linearly with increasing O_2 content up to 80%, as for the nonacetylated polymer at 160C. A further increase in O_2 content does not cause the reaction rate to increase. The oxidative degradation is of the first order over a wide concentration range (up to 80%). A kinetic equation is proposed which describes the variation in the rate of thermooxidative degradation for both types of PFA in relation to the O_2 concentration. This equation leads to the conclusion that active centers of degradation of a dual nature are present. The main stipulation of the equation is the nonequality of the rates of destruction of the active centers during the reaction with oxygen. However, different rates of reaction of the active centers with the same chemical agents, in the case of O_2, can only be obtained if these centers themselves are different. The effect of oxygen on the rate of variation in molecular weight was plotted at 200C at different O_2 concentrations for polymers with hydroxyl and acetyl end groups. The variation in the molecular weight for the acetylated polymer is independent of the O_2 concentration. A correlation was found between the degree of oxidative degradation and the extent of polymer chain rupture according to the "random law" obeyed by the acetylated polymer for all

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ACCESSION NR: AP4049145

ways of initiating the degradation (O_2 in any concentration, O_2+HCOOH, H_2O_2). The study of the kinetics of formic acid accumulation during the degradation of acetylated polymer showed that formic acid accumulated much more slowly with nonacetylated polymer and that the formic acid content in the reaction products increased in proportion to the increase in O_2 concentration. The experimental data confirmed previous theoretical concepts for the mechanism of HCOOH formation. Orig. art. has: 5 figures and 1 formula.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 23Nov63 ENCL: 00 SUB CODE: OC, GC

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

L 16372-65 EPA(s)-2/EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Pa-4/Pt-10
WW/RM
ACCESSION NR: AP4049146 S/0190/64/006/011/1931/1937

AUTHOR: Dudina, L. A.; Zharova, T. E.; Karmilova, L. V.; Yenikolopyan, N. S.

TITLE: The effect of stabilizing additives on the degradation of polyformaldehyde

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 6, no. 11, 1964, 1931-1937

TOPIC TAGS: polyamide, diphenylamine, phosphine, thermal degradation, oxidative degradation, phenol, polyformaldehyde, polyformaldehyde degradation, polymer stabilization, polymer additive

ABSTRACT: The effect of polyamide 54/10, diphenylamine, 2,2'-methylene-bis-4-methyl-6-tert-butyl phenol and various phosphorus compounds (phosphites, phosphates and phosphines) on the thermooxidative degradation of polyformaldehyde (PFA) with hydroxyl and acetyl end groups was investigated over a temperature range of 180-200C. The effect of polyamide was investigated in a vacuum, argon and oxygen. Polyamides were found to inhibit the thermal degradation and less markedly the oxidative degradation of both types of PFA. This was shown by a decrease in the maximum rate of degradation and by the absence of any influence on the induction period. The stabilizing effect of polyamides depends only slightly on the binding of the liberated monomer. On the basis of tabulated

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ACCESSION NR: AP4049146

experimental data obtained in argon (2% formic acid, 200C), no correlation was found between polyamide and formic acid, one of the main products of thermooxidative degradation. The behavior of the polyamide in the degradation of PFA was interpreted in terms of the concept of the active center as a radical or ion pair. It was established that the aromatic amines and phenols decrease the rate of thermooxidative degradation of both types of polymer and increase the induction period of the acetylated PFA. A stabilizing effect was observed for mixtures of polyamide with amines and phenols. The differences in the effect of radical inhibitors on the thermooxidative degradation of acetylated and unacetylated polymers are explained by the dual nature of the active centers of degradation (different mechanism of nucleation). The thermal oxidation is caused only by the ions, but the oxidative degradation is due in large part to radical processes, which are not inhibited by the ion stabilizer. The unsuitability of phosphorus compounds for the stabilization of PFA was demonstrated. Orig. art. has: 1 table and 7 figures.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 23Nov63 ENCL: 00 SUB CODE: OC, GC

NO REF SOV: 009 OTHER: 001

Card 2/2

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

L 28437-66 EWT(m)/EWP(j)/T IJP(c) WW/RM

ACC NR: AP6017976 SOURCE CODE: UR/0413/66/000/010/0079/0079

INVENTOR: Yenikolopov, N. S.; Karmilova, L. V.; Konareva, G. P.; Plechova, O. A.; Vol'fson, S. A.; Brikenshteyn, A. A.

ORG: none

34
B

TITLE: Preparative method for heat-resistant copolymers of trioxane. Class 39, No. 181808

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 10, 1966, 79

TOPIC TAGS: heat resistant copolymer, trioxane, cyclic ether, copolymer

ABSTRACT: An Author Certificate has been issued for a preparative method for heat-resistant copolymers of trioxane and cyclic ethers such as 1,3,6-trioxacyclooctane, 1,3,7-trioxacyclodecane, or 1,3,8-trioxacyclododecane. The method involves bulk copolymerization of the monomers in the presence of cationic catalysts, first below the mp and then above the mp of the monomers. [BO]

SUB CODE: 07,11/ SUBM DATE: 02Jun64/ ATD PRESS: 5005

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

ZOLOTAVINA, I.L., kand.med.nauk, KARMILOVA, V.A.

Air cysts of the small and large intestine in nursing children [with summary in English]. Pediatriia 36 no.5:58-61 My'58 (MIRA 11:6)

1. Iz L'vovskogo nauchno-issledovatel'skogo instituta okhrany materinstva i detstva (dir. I.D. Yashchuk) i Oblastnoy klinicheskoy bol'nitsy okhrany materinstva i detstva (glavnyy vrach I.A. Karagodin).
(INTESTINES--TUMORS)
(CYSTS)
(INFANTS--DISEASES)

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

ZOLOTAVINA, M.L., kand. med. nauk; KARMILOVA, V.A.

Air cysts of the small and large intestine in infants. Pediatriia 37 no.5:73-76 My '59. (MIRA 12:8)

1. Iz L'vovskogo nauchno-issledovatel'skogo instituta okhrany materinstva i detstva (dir. I.D. Yashchuk) i Oblastnoy klinicheskoy bol'nitsy okhrany materinstva i detstva (glavnyy vrach I.A. Karagodin).
(INTESTINES, cysts
air cysts of small & large intestines in inf. (Rus))

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S of C 4

Crude Natural Rubber

Rubber vulcanisation. VII. Influence of organic accelerators on the kinetics of vulcanisation and the properties of natural rubber vulcanisates. B. Dogadkin, B. Karmin, A. Dobromyslova and I. Sapozhkova. *Koll. Zhur.*, 1948, **10**, 268-80. *Brit. Abs.*, 1949, **BII**, 1121; *Chem. Abs.*, 1949, **43**, 8192. Cf. *Summary*, 1949, **27**, 557. The effect of diphenylguanidine, mercaptobenzthiazole, and tetramethylthiuram disulphide on the vulcanisation kinetics of a mix were studied. The mix was smoked sheet 100, sulphur 2, zinc oxide 5, and stearic acid 2 parts by weight. Equimolecular amounts of the accelerators were added as 0.7[illegible], 0.6, and 0.855 parts respectively. Vulcanisation was carried out at 123°, 133°, 143°, and 153°. The product was tested for resistance to fracture on a dynamometer, for swelling, and for [illegible] sulphur. Mercaptobenzthiazole accelerates [illegible]

dation, which is slowed down by the other two. These also favour breakdown of molecular bonds of rubber during destructive oxidation. The accelerators increase the bridge sulphur in vulcanisates in the form of the monosulphide in which sulphur is linked with an allyl radical. Diphenylguanidine does not change the resistance to rupture during rise of temperature; tetramethylthiuram disulphide increases it, and mercaptobenzthiazole lowers it. The limiting stability in all cases decreases with rising temperature. 3572

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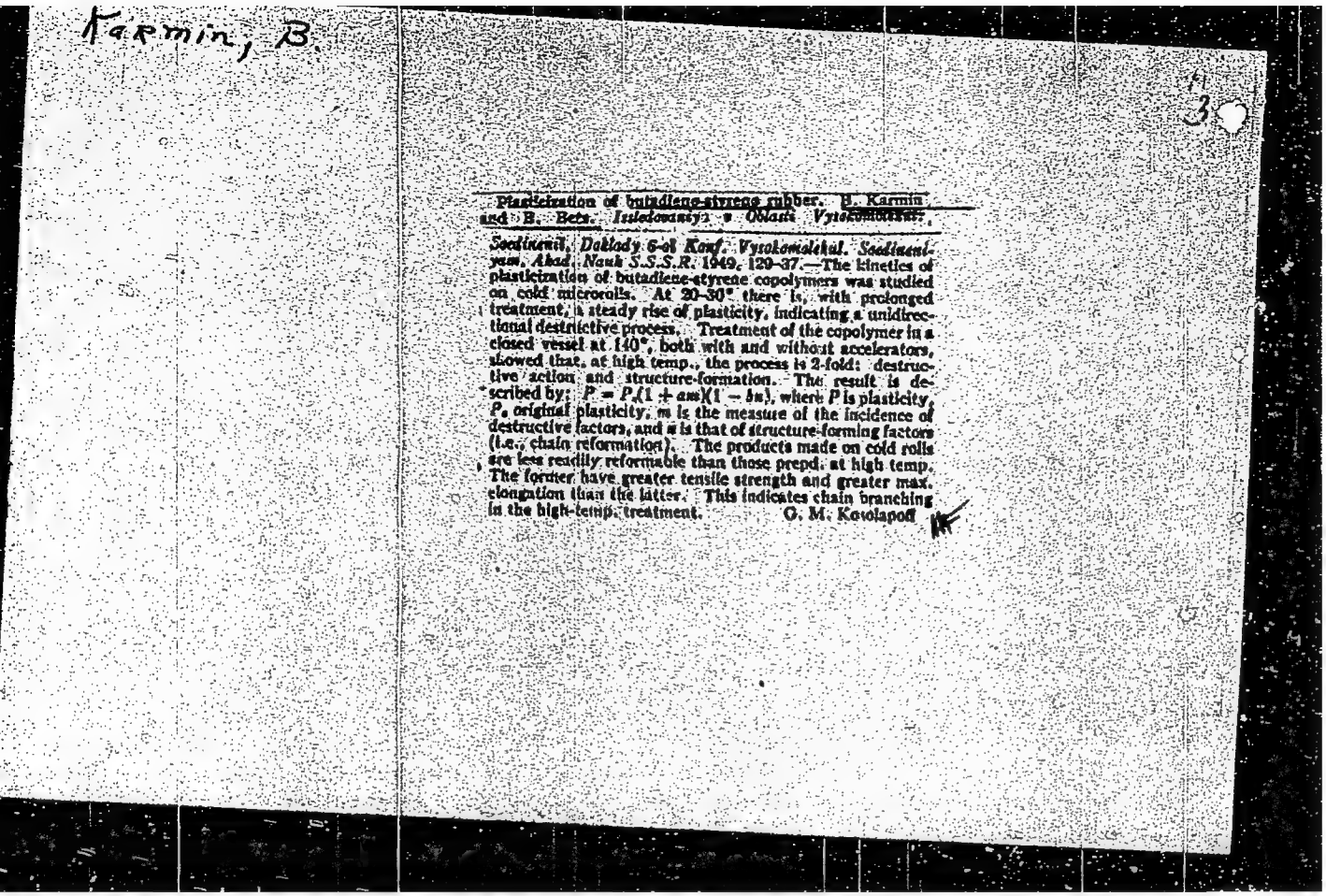

Karmin, B.

Plasticization of butadiene-styrene rubber. B. Karmin and B. Bets. *Issledovaniya v Oblasti Vysokomolekul.* *Soedinenii, Doklady 6-oi Konf. Vysokomolekul. Soedinenii. Akad. Nauk S.S.S.R.* 1949, 129–37.—The kinetics of plasticization of butadiene-styrene copolymers was studied on cold microrolls. At 20–30° there is, with prolonged treatment, a steady rise of plasticity, indicating a unidirectional destructive process. Treatment of the copolymer in a closed vessel at 140°, both with and without accelerators, showed that, at high temp., the process is 2-fold: destructive action and structure-formation. The result is described by: $P = P_0(1 + am)(1 - bn)$, where P is plasticity, P_0 original plasticity, m is the measure of the incidence of destructive factors, and n is that of structure-forming factors (i.e., chain reformation). The products made on cold rolls are less readily reformable than those prepd. at high temp. The former have greater tensile strength and greater max. elongation than the latter. This indicates chain branching in the high-temp. treatment. G. M. Kovalapoff

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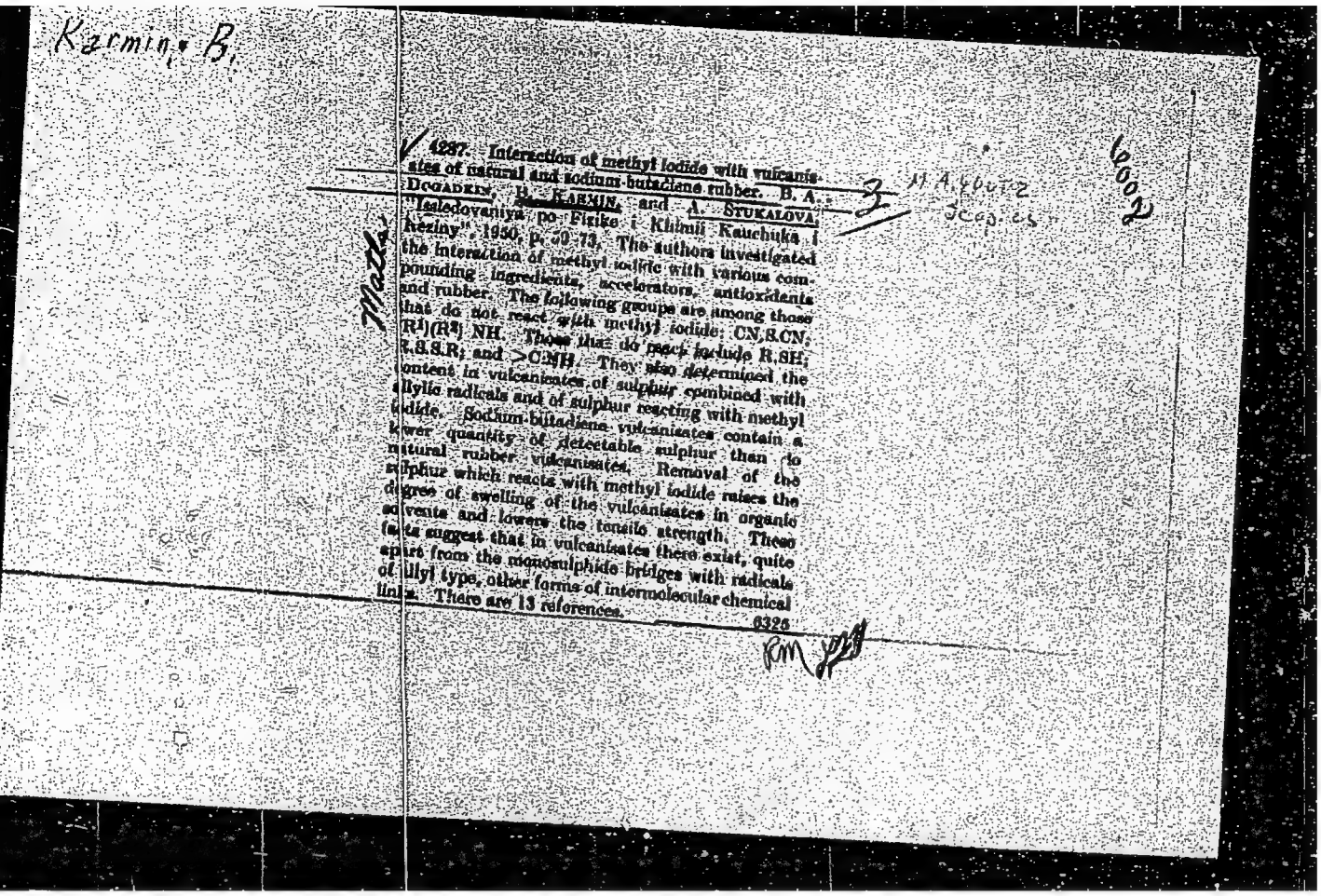

Karmin, B.

6002

4287. Interaction of methyl iodide with vulcanisates of natural and sodium-butadiene rubber. B. A. DOGADKIN, B. KARMIN, and A. STUKALOVA. "Issledovaniya po Fizike i Khimii Kauchuka i Reziny", 1950, p. 59-73. The authors investigated the interaction of methyl iodide with various compounding ingredients, accelerators, antioxidants and rubber. The following groups are among those that do not react with methyl iodide: CN,S.CN; $R^1)(R^2)$ NH. Those that do react include R.SH; R.S.S.R; and >C:NH. They also determined the content in vulcanisates of sulphur combined with allylic radicals and of sulphur reacting with methyl iodide. Sodium-butadiene vulcanisates contain a lower quantity of detectable sulphur than do natural rubber vulcanisates. Removal of the sulphur which reacts with methyl iodide raises the degree of swelling of the vulcanisates in organic solvents and lowers the tensile strength. These facts suggest that in vulcanisates there exist, quite apart from the monosulphide bridges with radicals of allyl type, other forms of intermolecular chemical links. There are 13 references. 6325

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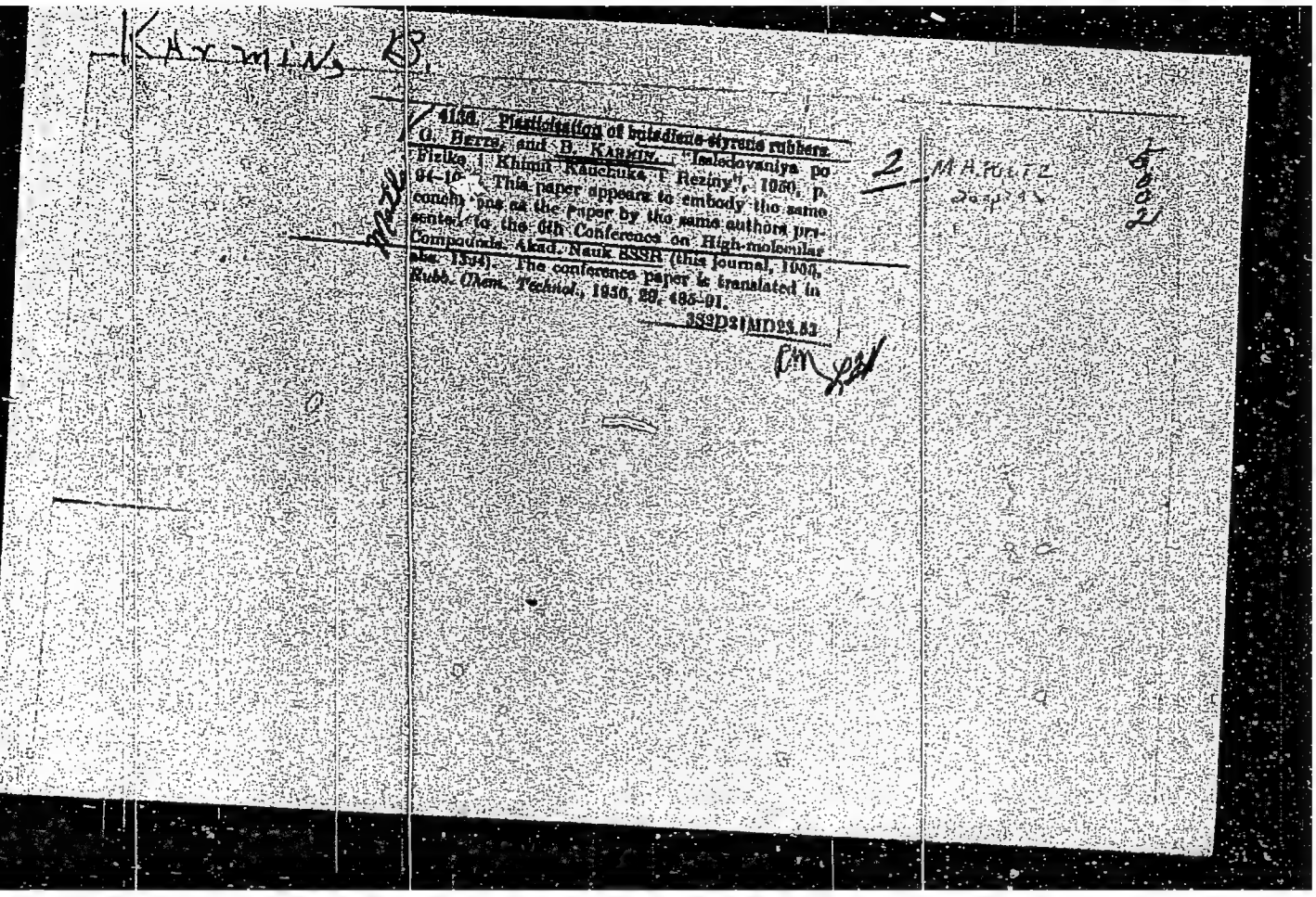

KARMIN, B.

4136. Plasticization of butadiene-styrene rubbers. G. BETTS, and B. KARMIN. "Issledovaniya po Fizike i Khimii Kauchuka i Reziny", 1950, p. 94-10[illegible]. This paper appears to embody the same conclusions as the paper by the same authors presented to the 6th Conference on High-molecular Compounds, Akad. Nauk SSSR (this journal, 1955, abs. 1394). The conference paper is translated in *Rubb. Chem. Technol.*, 1956, 29, 485-91.

3S2D21MD23.53

2 M.A. [illegible]

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KARMIN, B. K.; ORLOVSKIY, P. N.; VOYUTSKIY, S. S.

"B. A. Dogadkin," Kolloidnyy Zhurnal, Vol 12, No 4, Jul - Aug 1950, pp 311 - 312.

Review W-15655, 6 Dec 50

Karmin, B.K.

USSR/Chemical Technology. Chemical Products and Their Application--Crude rubbers, natural and synthetic. Vulcanized rubber APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

I-22

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9785

Author : Begunovskaya, L. M., Zhakova, V. G., Karmin, B. K., and Epshteyn, V. G.

Inst : Not given

Title : Aging and Fatigue of Rubbers Vulcanized in the Presence of Various Accelerators and Antioxidants

Orig Pub: Sb.: Starenie i utomleniye kauchukov i rezin i povysheniye ikh stoykosti [Symposium on the Aging and Fatigue of Rubbers and the Improvement of their Aging Resistance], Leningrad, Goskhimizdat, 1955, 31-52

Abstract: Phenyl- β -naphthylamine (I) and 2,4-diaminodiphenylamine (II) retard the oxidation of natural rubber by molecular O_2. The addition of I accelerates the destruction of the rubber during low-temperature mechanical plastization, with resultant

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CA

Investigations in the field of vulcanization of rubber. IV. The optimum vulcanization of mixtures with high content of the structure forming agent B. Dogadkin and B. Karmin. *Kolloid Zhur.* 9, 348-51(1947); cf. C.A. 42, 2806f, 40, 1685f, 41, 3415f, *Kolloid Zhur.* 9, 255(1947).

The time curve of the tensile strength (E) of natural rubber, vulcanized with 2% S, and mercaptobenzothiazole (0.6%) or diphenylguanidine (0.756%), has a max. at exactly the moment when all the S has combined, and the time curve of the degree of swelling reaches a min. at exactly the same moment; beyond that point, E falls and the swelling increases again with time. This behavior is attributed to opposed effects of structure build-up by the S and structure disruption by atm. O_2. It contrasts with the kinetics of vulcanization in the presence of a high amt. (7%) of S and the same accelerators (0.3 or 0.378%, resp.) or without accelerator. In this case, the max. of the time curve of E is at a moment when about 3.5% S (with respect to the wt. of the rubber) has combined, and the curve of the degree of swelling has no min. but continues to decrease uniformly with time beyond the point of max. E; more S continues to combine along the branch of falling E. These curves, for high S contents, cannot be interpreted in terms of antagonistic structure formation and disruption. A max. E on the kinetic curve may, in this instance, be due to inhibited formation of the cryst. phase by the increasingly dense spatial network formed by vulcanization. In rubbers at various stages of vulcanization, with different S contents and different accelerators, E was a linear function of the amt. of cryst. phase formed by stretching 500%, as detd. by x rays; hence, increasing inhibition of crystal formation may result in a fall of E at stages where the binding of S is still far from completed. With the same rubber batch, smoked sheet 100, S 7, ZnO 5, diphenylguanidine 0.38, stearic acid 2 parts, the max. E occurred the earlier, and was the higher, the greater the rate of stretching (between 500 and 50 mm. per min.). This effect is absent in batches with a low S content, and is explained by a slowing down of orientation, i.e. of crystn. of the rubber chains, with increasing rate of deformation, owing to relaxation; in other words, a higher rate of stretching acts in the same direction as an increased d. of the network. Of the 2 types of kinetic curves of vulcanization, due to different mechanisms, one characterized by a max. E coinciding with the completion of combination of S and with a min. of the degree of swelling, the other by an earlier max. of E and absence of a min. swelling, only the 2nd type is observed in Na butadiene rubber, even at the low S content of 2%, but, in contrast to the vulcanization of high-S natural rubber, the max. E occurs at a later stage than the completion of combination of S. N. Thon

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KARMIN, B.G.

68. Vulcanisation of rubber. III. Kinetics of the change of tensile strength during vulcanisation of natural rubber. B. A. DOGADKIN, B. KARMIN, and I. GOL'BERG. *Kol. Zhur.*, 1947, 9, 215-60; Translation: *Rubb. Chem. Technol.*, 1954, 27, 615-21. It is shown that the tensile strength of vulcanised butadiene-styrene rubber is a linear function of the plasticity of the original material. Proceeding from the concept of the presence during vulcanisation of a number of opposing processes of structure formation and destruction, both of which influence the molecular weight of the rubber, a general equation is derived which expresses the kinetics of the change of tensile strength of a vulcanisate. Experimental material is offered which proves the applicability of the proposed equation to the representation of the kinetics of vulcanisation of natural rubber mixes with relatively small sulphur contents (up to 3%). 38724.

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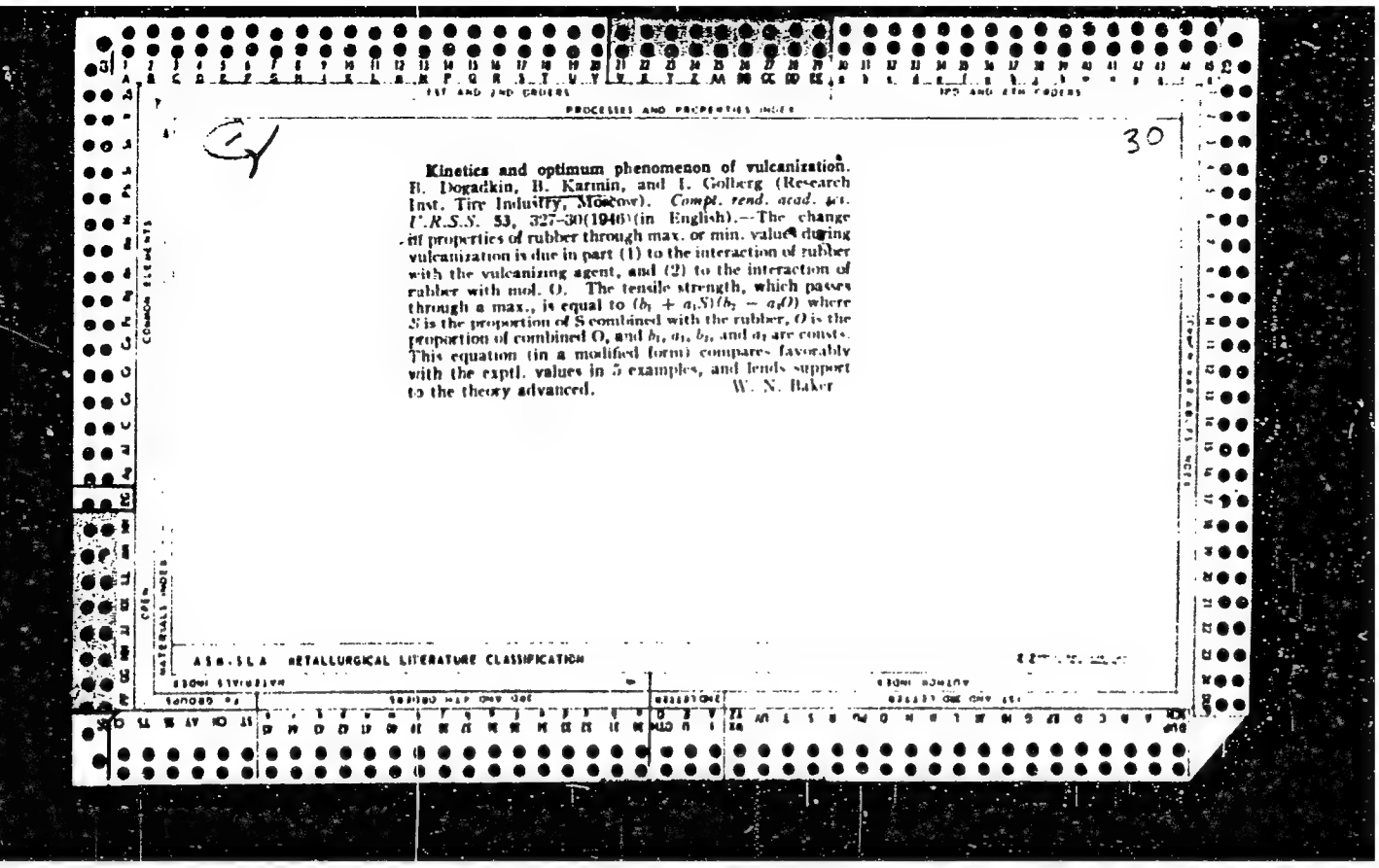

Kinetics and optimum phenomenon of vulcanization. B. Dogadkin, B. Karmin, and I. Golberg (Research Inst. Tire Industry, Moscow). *Compt. rend. acad. sci. U.R.S.S.* 53, 327–30(1946)(in English).—The change in properties of rubber through max. or min. values during vulcanization is due in part (1) to the interaction of rubber with the vulcanizing agent, and (2) to the interaction of rubber with mol. O. The tensile strength, which passes through a max., is equal to $(b_1 + a_1S)(b_2 - a_2O)$ where S is the proportion of S combined with the rubber, O is the proportion of combined O, and b_1, a_1, b_2, and a_2 are consts. This equation (in a modified form) compares favorably with the exptl. values in 5 examples, and lends support to the theory advanced. W. N. Baker

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S/081/61/000/023/052/061
B106/B101

AUTHORS: Betts, G. E., Chakova, V. G., Karmin, B. K., Strel'nikova, N. P., Eytingon, I. I.

TITLE: Chemical mastication accelerators for natural and synthetic rubber and prospects of their application

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 23, 1961, 559, abstract 23P344. (Tr. N.-i. in-ta shin. prom-sti, sb. 5, 1960, 21-55)

TEXT: Numerous compounds have been examined, many of which are vulcanization accelerators. Dimethyl phenyl p-cresol (I) was found to be the most active chemical mastication accelerator for СКС-30 (SKS-30) rubber. In the presence of 1.2 parts by weight of I, mastication can be carried out in kettles within 30 to 50 min at 130°C as against 70 min at 135°C without I. A similar accelerating action is exerted by I on the mastication of СКН (SKN) and СКИ (SKI) rubber, but not on that of НК (NK) rubber. Active mastication accelerators for NK rubber are Renacit II, IV, and V (trichlorothiophenol, zinc salt of pentachlorothiophenol, or pentachlorothiophenol, respectively), Vulkamel TBN (30% thio-β-naphthol and 67% inert paraffin).

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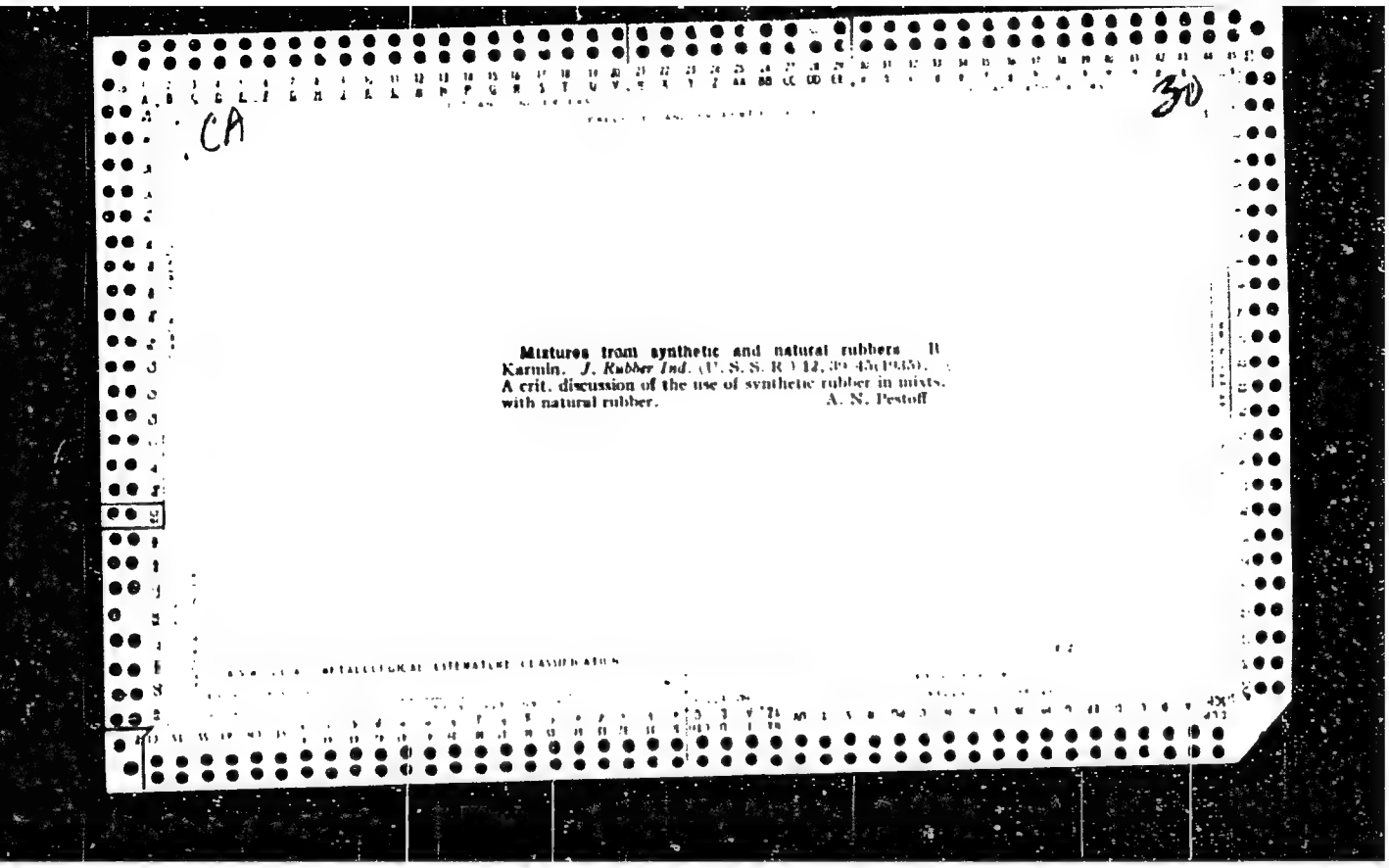

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Mixtures from synthetic and natural rubbers. II Karmin. *J. Rubber Ind.* (U. S. S. R.) 12, 39–45 (1935). A crit. discussion of the use of synthetic rubber in mixts. with natural rubber. A. S. Pestoff

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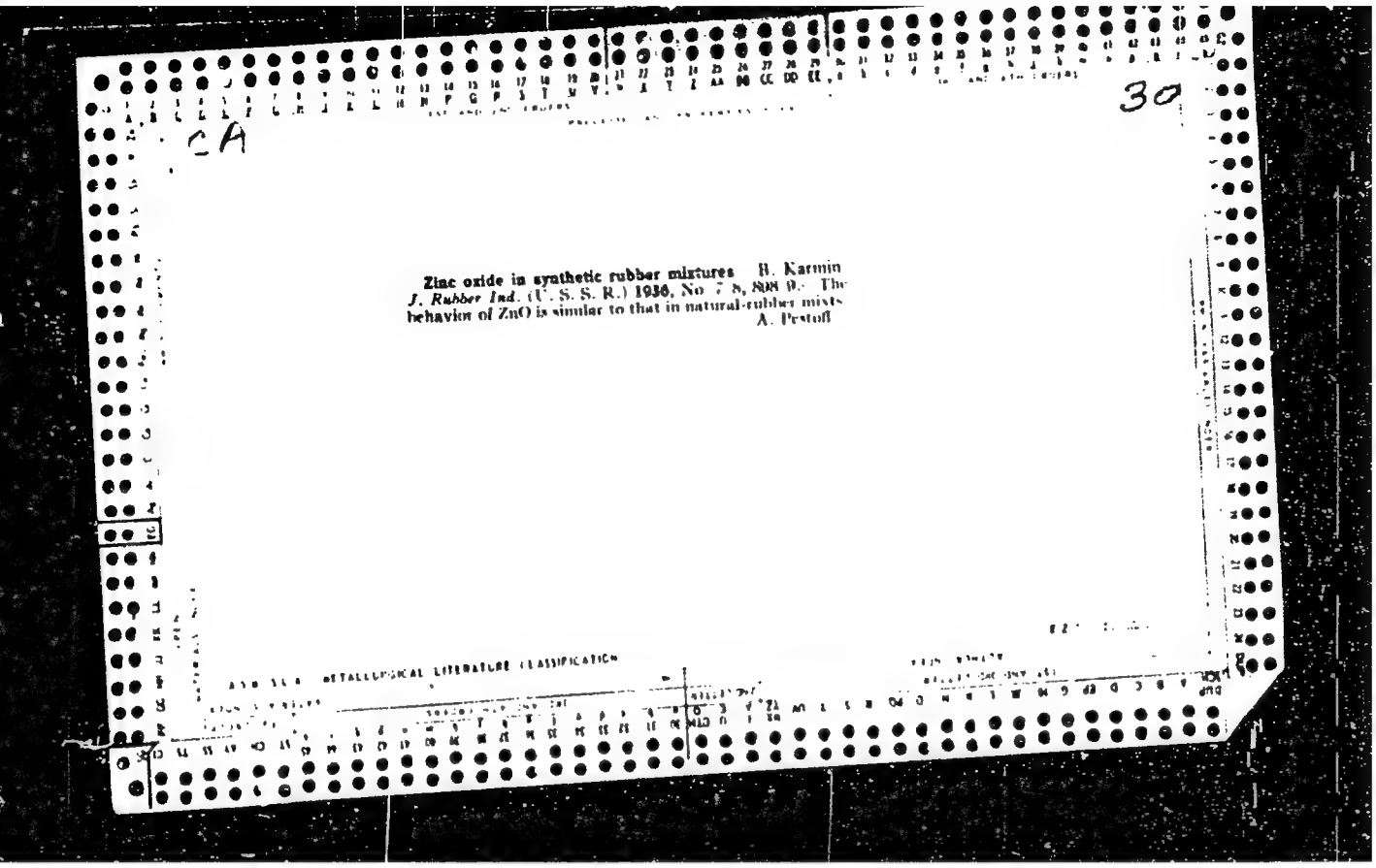

Zinc oxide in synthetic rubber mixtures B. Karmin
J. Rubber Ind. (U. S. S. R.) 1936, No 7-8, 808 0.- The
behavior of ZnO is similar to that in natural-rubber mixts
A. Prestoff

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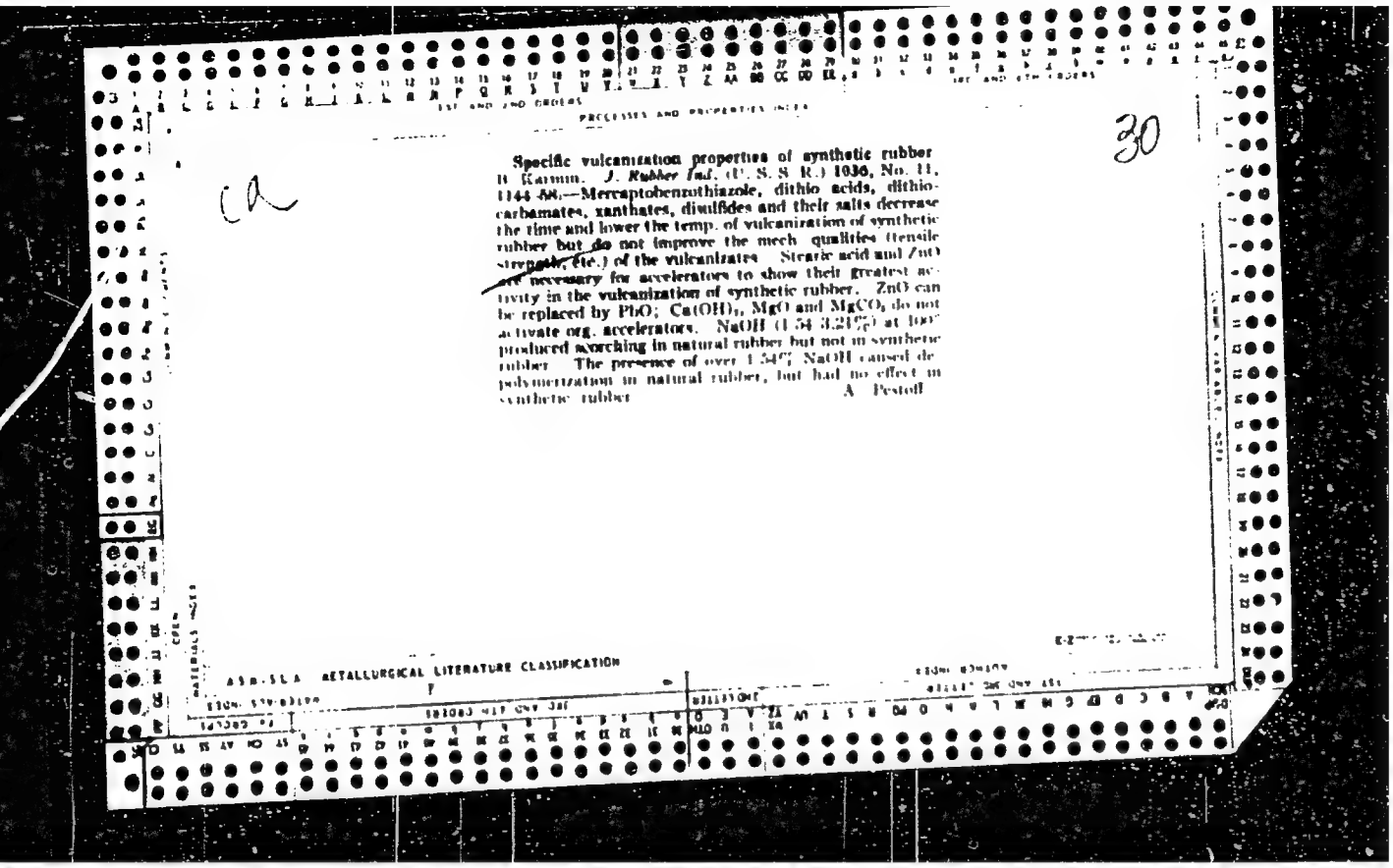

Specific vulcanization properties of synthetic rubber
B Karmin. *J. Rubber Ind.* (U. S. S. R.) **1936**, No. 11, 1144-58.—Mercaptobenzothiazole, dithio acids, dithiocarbamates, xanthates, disulfides and their salts decrease the time and lower the temp. of vulcanization of synthetic rubber but do not improve the mech. qualities (tensile strength, etc.) of the vulcanizates. Stearic acid and ZnO are necessary for accelerators to show their greatest activity in the vulcanization of synthetic rubber. ZnO can be replaced by PbO; $Ca(OH)_2$, MgO and $MgCO_3$ do not activate org. accelerators. NaOH (1.54-3.21%) at 100° produced scorching in natural rubber but not in synthetic rubber. The presence of over 1.54% NaOH caused depolymerization in natural rubber, but had no effect in synthetic rubber.
A. Pestoff

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ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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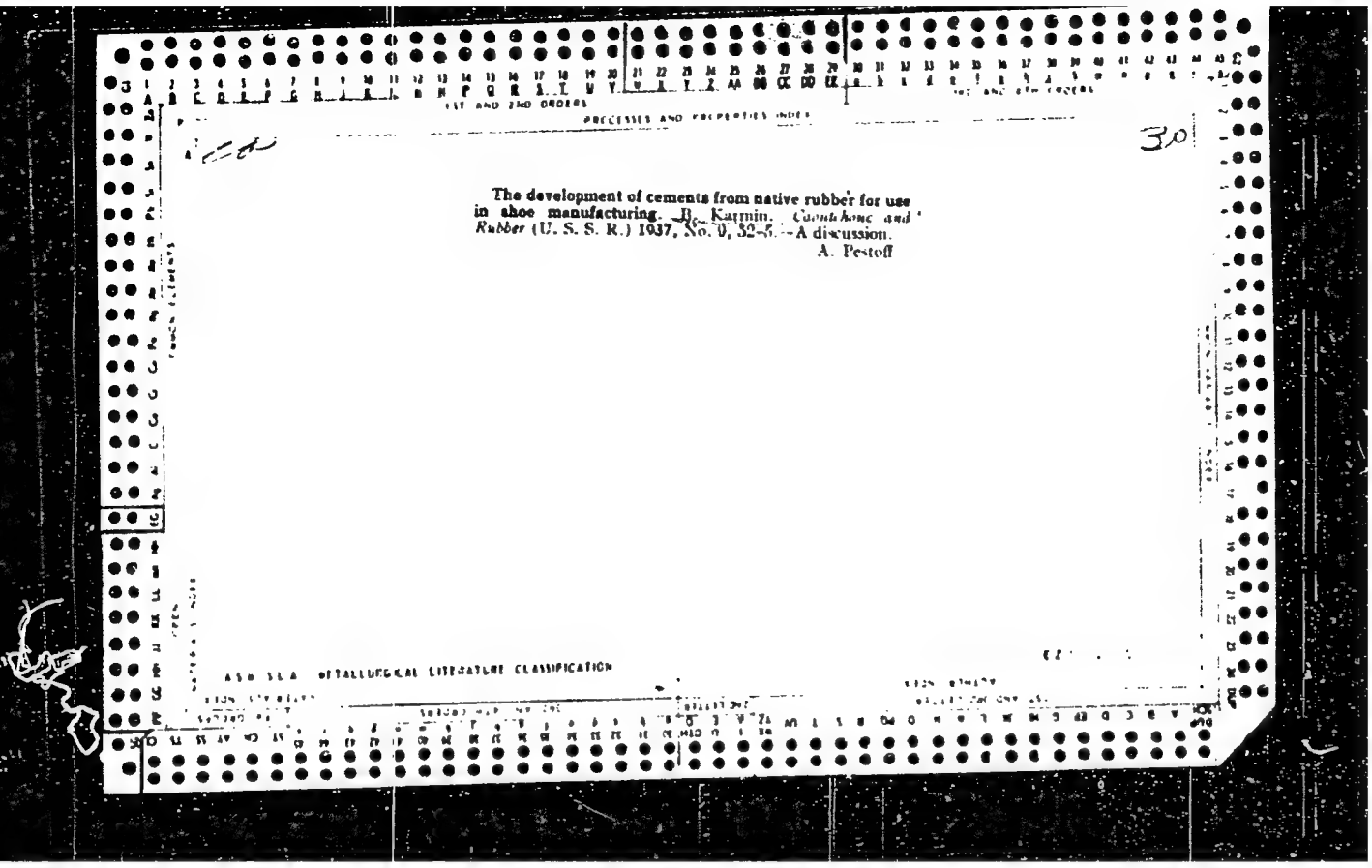

The development of cements from native rubber for use in shoe manufacturing. B. Katmin. *Caoutchouc and Rubber* (U. S. S. R.) 1937, No. 9, 52–5.—A discussion.
A. Pestoff

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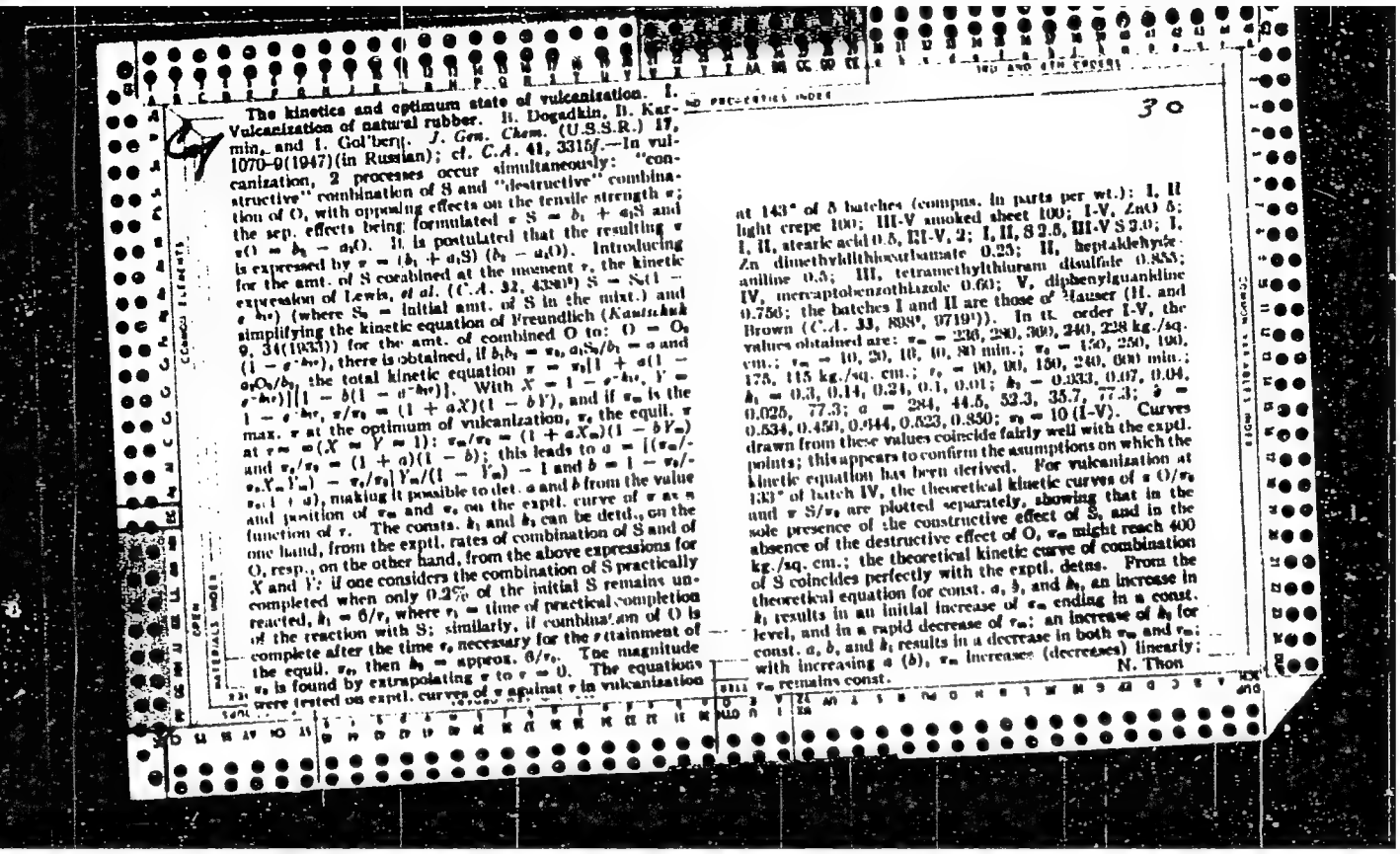

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The kinetics and optimum state of vulcanization. I. Vulcanization of natural rubber. B. Dogadkin, B. Karmin, and I. Gol'berg. *J. Gen. Chem.* (U.S.S.R.) **17**, 1070–9(1947)(in Russian); *cf. C.A.* **41**, 3315*f*.—In vulcanization, 2 processes occur simultaneously: "constructive" combination of S and "destructive" combination of O, with opposing effects on the tensile strength σ; the sep. effects being formulated $\sigma S = b_1 + a_1 S$ and $\sigma(O) = b_2 - a_2 O$. It is postulated that the resulting σ is expressed by $\sigma = (b_1 + a_1 S)(b_2 - a_2 O)$. Introducing for the amt. of S combined at the moment τ, the kinetic expression of Lewis, *et al.* (*C.A.* **32**, 4380[8]) $S = S_0(1 - e^{-k_1\tau})$ (where S_0 = initial amt. of S in the mixt.) and simplifying the kinetic equation of Freundlich (*Kautschuk* 9, 34(1933)) for the amt. of combined O to: $O = O_0(1 - e^{-k_2\tau})$, there is obtained, if $b_1b_2 = \sigma_0$, $a_1S_0/b_1 = a$ and a_2O_0/b_2 the total kinetic equation $\sigma = \sigma_0[1 + a(1 - e^{-k_1\tau})][1 - b(1 - e^{-k_2\tau})]$. With $X = 1 - e^{-k_1\tau}$, $Y = 1 - e^{-k_2\tau}$, $\sigma/\sigma_0 = (1 + aX)(1 - bY)$, and if σ_m is the max. σ at the optimum of vulcanization, σ_e the equil. σ at $\tau = \infty$ ($X = Y = 1$): $\sigma_m/\sigma_e = (1 + aX_m)(1 - bY_m)$ and $\sigma_e/\sigma_0 = (1 + a)(1 - b)$; this leads to $a = [(\sigma_m/\sigma_e)X_m - Y_m]/(1 - Y_m) - 1$ and $b = 1 - \sigma_0/\sigma_e(1 + a)$, making it possible to det. a and b from the value and position of σ_m and σ_e on the exptl. curve of σ as a function of τ. The consts. k_1 and k_2 can be detd., on the one hand, from the exptl. rates of combination of S and of O, resp., on the other hand, from the above expressions for X and Y; if one considers the combination of S practically completed when only 0.2% of the initial S remains unreacted, $k_1 = 6/\tau_1$ where τ_1 = time of practical completion of the reaction with S; similarly, if combination of O is complete after the time τ_2 necessary for the attainment of the equil. σ_e then k_2 = approx. $6/\tau_2$. The magnitude of σ_0 is found by extrapolating σ to $\tau = 0$. The equations were tested on exptl. curves of σ against τ in vulcanization at 143° of 5 batches (compns. in parts per wt.): I, II light crepe 100; III-V smoked sheet 100; I-V, ZnO 5; I, II, stearic acid 0.5, III-V, 2; I, II, S 2.5, III-V S 2.0; I, Zn dimethyldithiocarbamate 0.25; II, heptaldehyde-aniline 0.5; III, tetramethylthiuram disulfide 0.833; IV, mercaptobenzothiazole 0.60; V, diphenylguanidine 0.750; the batches I and II are those of Hauser (H. and Brown (*C.A.* **33**, 898[9], 9719[1])). In the order I-V, the values obtained are: σ_m = 230, 280, 300, 240, 228 kg./sq. cm.; τ_m = 10, 20, 10, 10, 80 min.; σ_e = 150, 250, 100, 175, 115 kg./sq. cm.; τ_e = 90, 90, 150, 240, 600 min.; k_1 = 0.3, 0.14, 0.24, 0.1, 0.01; k_2 = 0.333, 0.07, 0.04, 0.025, 77.3; a = 284, 44.5, 52.3, 35.7, 77.3; b = 0.534, 0.450, 0.944, 0.523, 0.850; σ_0 = 10 (I-V). Curves drawn from these values coincide fairly well with the exptl. points; this appears to confirm the assumptions on which the kinetic equation has been derived. For vulcanization at 133° of batch IV, the theoretical kinetic curves of σ O/σ_0 and σ S/σ_0 are plotted separately, showing that in the sole presence of the constructive effect of S, and in the absence of the destructive effect of O, σ_m might reach 400 kg./sq. cm.; the theoretical kinetic curve of combination of S coincides perfectly with the exptl. detns. From the theoretical equation for const. a, b, and k_2, an increase in k_1 results in an initial increase of σ_m ending in a const. level, and in a rapid decrease of τ_m; an increase of k_2 for const. a, b, and k_1 results in a decrease in both σ_m and τ_m; with increasing a (b), σ_m increases (decreases) linearly; τ_m remains const.

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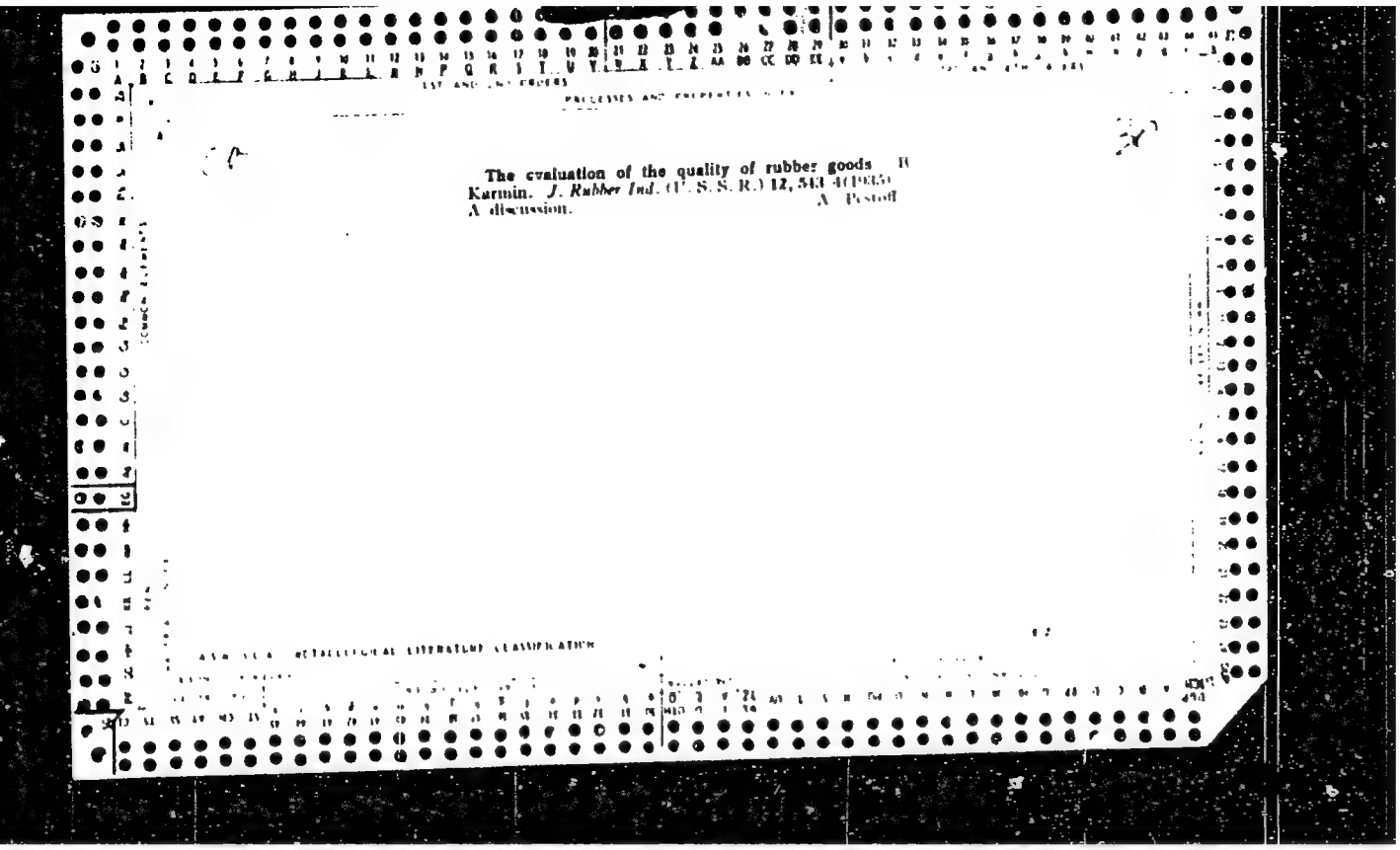

The evaluation of the quality of rubber goods II
Karmin. *J. Rubber Ind.* (U. S. S. R.) 12, 543-4(1935)
A discussion. A. Pestoff

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

USSR/Chemical Technology. Chemical Products and Their Application--Crude rubbers, natural and synthetic. Vulcanized rubber I-22

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9705

Abstract: izates containing II than in vulcanizates containing I). The effect of I and II on the fatigue of rubbers during deformation tests in which equal amounts of energy are stored in the rubbers was found to be equal. II is more active in the fatigue of unfilled vulcanizates from SKB rubber. The resistance to aging of vulcanizates prepared from natural rubber increases as the amount of accelerator is increased and the amount of S is decreased. The resistance to aging depends on the curation of vulcanization. Revulcanization of the mixture with Captax leads to a sharp decrease in aging resistance; this effect is not observed in rubbers containing thiuram and DPG. In the presence of an accelerator the degree of homogeneity of the molecular structure of the vulcanizates is in-

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USSR/Chemical Technology. Chemical Products and Their Application- Crude rubbers, natural and synthetic. Vulcanized rubber I-22

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9705

Abstract: loss of strength in the vulcanized rubber. II promotes polymerization, hence vulcanizates containing II show increased modulus of elasticity and tensile strength. II favors while I inhibits molecular interactions and the modulus of elasticity and dynamic relaxation of vulcanizates containing II show a larger increase than the same quantities in vulcanizates containing I when the test temperature is lowered. II is more effective than I in protecting the vulcanized rubber from oxidative thermal aging; in the former case the modulus of elasticity increases during the test, while in the latter case it decreases. The increase in heterogeneity of the vulcanizates during aging was measured by the variation in the tensil strength (the latter variation is markedly lower in vulcan-

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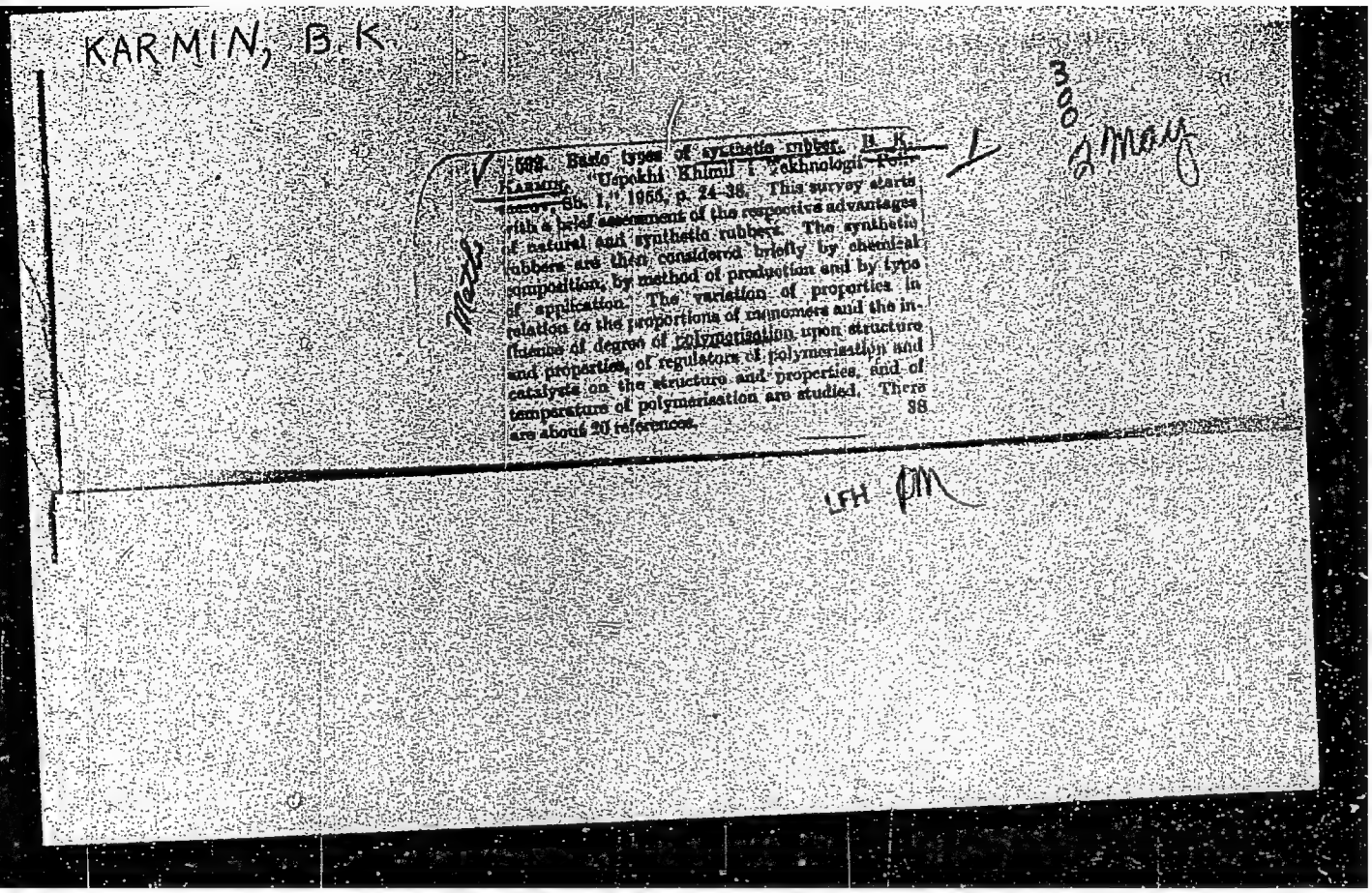

KARMIN, B. K.

608. Basic types of synthetic rubber. B. K. Karmin. "Uspekhi Khimii i Tekhnologii Kauchuka," Sb. 1," 1955, p. 24-38. This survey starts with a brief assessment of the respective advantages of natural and synthetic rubbers. The synthetic rubbers are then considered briefly by chemical composition, by method of production and by type of application. The variation of properties in relation to the proportions of monomers and the influence of degree of polymerisation upon structure and properties, of regulators of polymerisation and catalysts on the structure and properties, and of temperature of polymerisation are studied. There are about 20 references. 38

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KARMIN, Bruno Karlovich (Sci-Res Inst of Tire Ind) awarded sci degree of Doc Chem Sci for the 17 Dec 56 defense of dissertation: "Structural changes in caoutchouc [kauchuk] and exploitation of rubber [rezina]" at the Council, Sci-Res Physico-Chem Inst imeni Karpov; Prot No 14, 31May 58.

(BMVO, 11-58,19)

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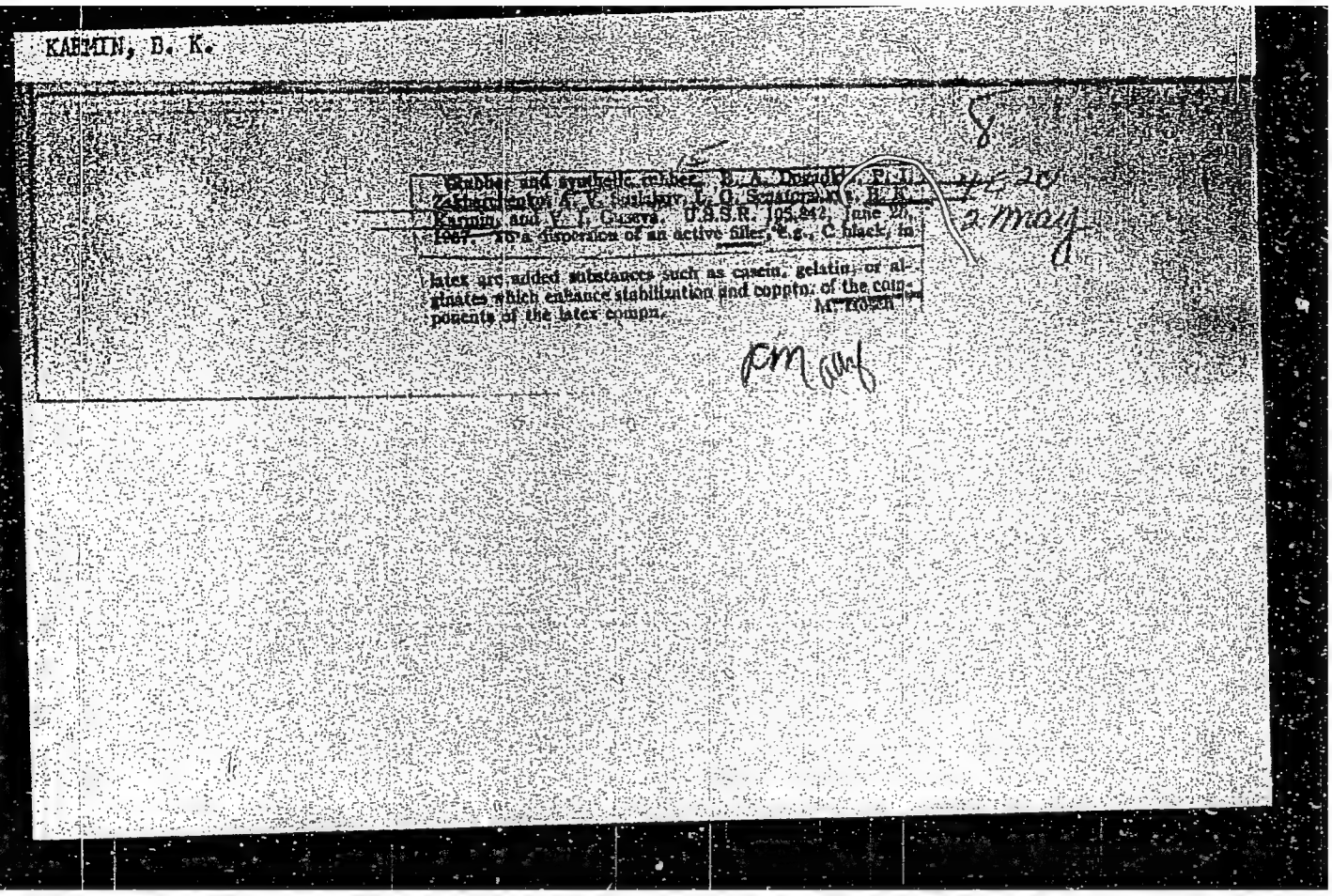

KARMIN, B. K.

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Rubber and synthetic rubber. B. A. Dogadkin, P. I. Zakharchenko, A. V. Suslakov, L. O. Senatorskaya, B. K. Karmin, and V. I. Gusova. U.S.S.R. 105,842, June 20, 1957. To a dispersion of an active filler, e.g., C black, in latex are added substances such as casein, gelatin, or alginates which enhance stabilization and copptn. of the components of the latex compn. M. Hosch

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

BEGUNOVSKAYA, L.M.; KARMIN, B.K.

Structure and properties of soft thermoplastic materials made from stiff butadiene-styrene rubbers. Kauch. i rez. 16 no.12:7-11 D '57. (MIRA 11:3)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti.
(Plastics) (Rubber, Synthetic)

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KARMIN, B.K., ANIKANOVA, K.F., ZHAKOVA, V.G., KOMSKAYA, N.F., FRISS, L.S., BETTS, G.E. REZNIKOVSKIY, MM., CHERNIKINA, L.A., and SHTEYN, E.B.

"Soviet Polyisoprene Rubber SKI, Similar to Natural Rubber in Structure and Properties." Kauchuk i Rezina, No. 1, pp. 4-14, 1957

Translation 1119944

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

USSR Chemical Technology. Chemical Products and Their Application. Crude rubbers, natural and synthetic. Vulcanized rubber I-22

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9785

Abstract: creased; this is particularly important in the case of rubbers which do not crystallize [TN: unoriented?] The fatigue resistance (FR) of the vulcanizates likewise depends on the degree of orientation of the molecules. Vulcanized specimens made from natural rubber with Captax show the FR, the lowest FR is exhibited by specimens vulcanized with thiuram. The FR is directly dependent on the thermal stability of the rubbers and on their resistance to oxidative thermal aging.

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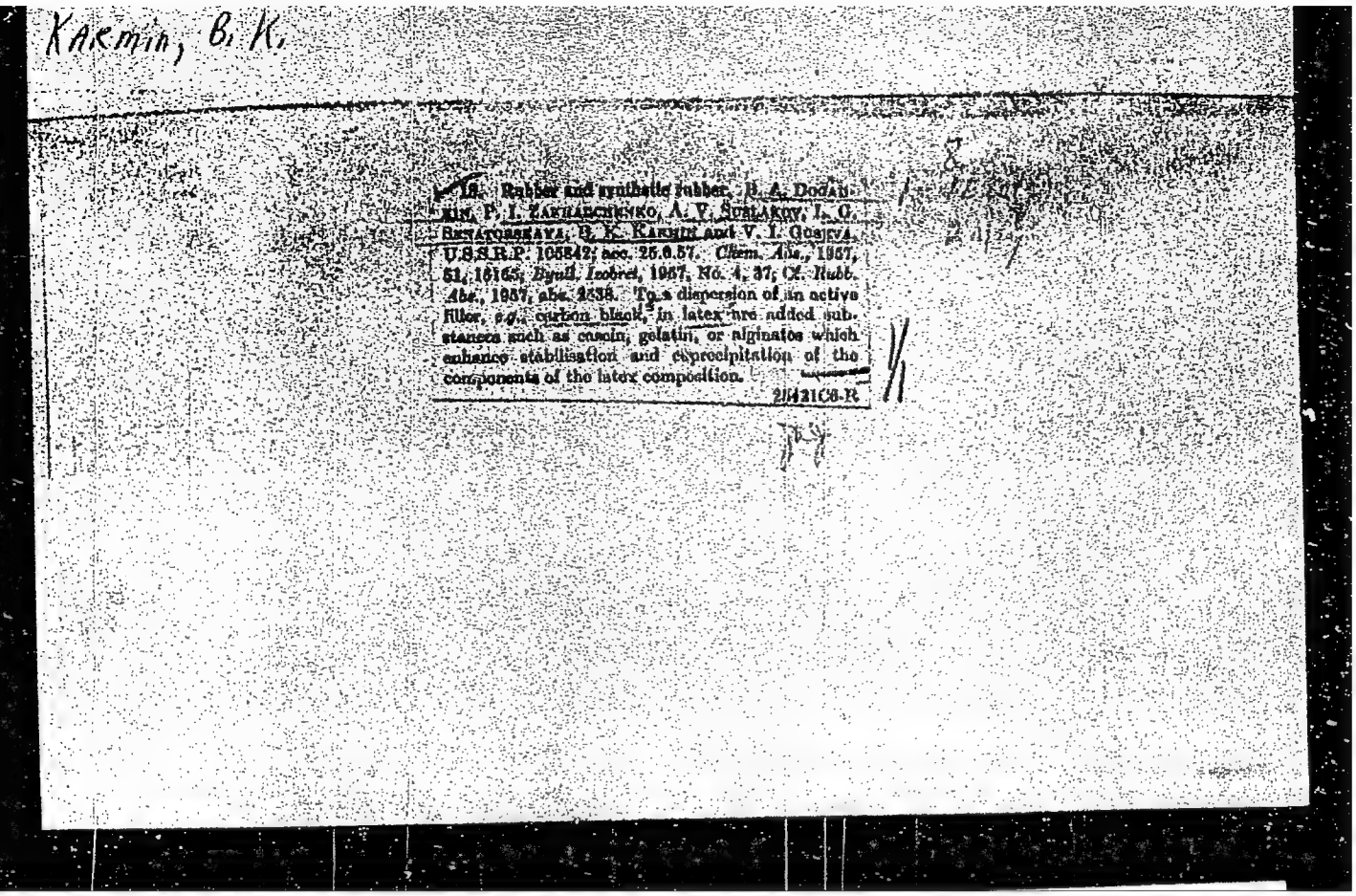

Karmin, B. K.

15. Rubber and synthetic rubber. B. A. Dogadkin, P. I. Zakharchenko, A. V. Sudakov, I. G. Ratnovskaya, B. K. Karmin and V. I. Gosteva. U.S.S.R.P. 105842; acc. 25.6.57. *Chem. Abs.*, 1957, 51, 16165; *Byull. Izobret*, 1957, No. 4, 37; *Cf. Rubb. Abs.*, 1957, abs. 2338. To a dispersion of an active filler, *e.g.*, carbon black, in latex are added substances such as casein, gelatin, or alginates which enhance stabilisation and coprecipitation of the components of the latex composition.

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S/138/60/000/005/007/012
A051/A029

AUTHORS: Betts, G.E., Karmin, B.K., Eytingon, I.I., Zhakova, V.G., Strel'nikova, N.P.

TITLE: The Mastication of Natural Rubber with O-Benzamidothiophenol, its Zinc Salt and O,O' -Dibenzamidodiphenyldisulfide

PERIODICAL: Kauchuk i Rezina, 1960, No. 5, pp. 24 - 27

TEXT: After brief reference to a previous article published in "Kauchuk i Rezina", 1959, No. 8, p. 32 by the authors on the action of thiophenols and their derivatives on the mastication of natural rubber, they point out that the present article deals with the results of an investigation of o-benzamidothiophenol, its zinc salt and o,o' -dibenzamidothiophenyldisulfide (peptón 22). The method by which o-benzamidothiophenol was obtained is described. It is stated that the mechanism of the reaction has not yet been clarified. The structural formulae of the reduction reaction are given for o,o' - dibenzamidodiphenyldisulfide, reduced to o-benzamidothiophenol with sodium hydroxide and glucose The physical and chemical properties of the obtained product are given: melting point 101 -

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A051/A029

The Mastication of Natural Rubber with O-Benzamidothiophenol, its Zinc Salt and O,O' -Dibenzamidodiphenyldisulfide

- 103°C, yield 75%. O-benzamidothiophenol has a characteristic odor, is hardly soluble in water and dissolves well in hot alcohol, and in acetone and chloroform when cold. The authors outline the procedure for obtaining the zinc salt of the original product, and describe its chemical and physical properties. It is pointed out that the salt obtained by the given method has similar properties as the imported salt. The activity of the benzamidothiophenol and its derivatives in mastication of rubber was further studied under laboratory conditions. The details of the investigation are submitted whereby laboratory rollers and the Krupp-Gruzon rubber mixer were used. Various concentration of pepton 22 were applied and the kinetics of the mastication at these concentrations can be seen in Figure 1. The obtained data reveal that the most active of the three investigated accelerators of mustication at the temperatures investigated, was o-benzamidothiophenol. Pepton 22 seemed to be the least active in the region where the mastication effectiveness dropped with an increase in the temperature. The zinc salt of o-benzamidothiophenol held an intermediate position. In

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A051/A029

The Mastication of Natural Rubber with O-Benzamidothiophenol, its Zinc Salt and O,O' - Dibenzamidodiphenyldisulfide.

the temperature region where the mastication rate increases with an increase in the temperature, the activities of the disulfide and the zinc salt of o-benzamidothiophenol gradually approach each other. The technological and technical properties of the masticated rubber obtained by o-benzamidothiophenol and its derivatives are discussed. Pepton 22 is recommended for industrial use as an accelerator of mastication, in addition to the zinc salt of o-benzamidothiophenol. Both are only slightly toxic and stable. The zinc salt is recommended for use at temperatures below 130°C, and peptone 22 at temperatures above 130°C. There are 5 figures and 1 table.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Scientific Research Institute of the Tire Industry).

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720810008-5

S/138/60/000/011/005/010
A051/A029

AUTHORS: Eytingon, I.I., Karmin, B.K., Zhakova, V.G., Betts, G.E., Kamenskaya, S.A.

TITLE: Mastication of Natural Rubber in the Presence of Para-Tertiary Butylphenolmercaptane, Dimethylphenylparacresolmercaptane, Their Zinc Salts and Disulfides

PERIODICAL: Kauchuk i rezina, 1960, No. 11, pp. 21-24

TEXT: The results are given of work carried out on the synthesis and study of paratertiary butylphenolmercaptane, dimethylphenylparacresolmercaptane, their zinc salts and disulfides, as accelerators of natural rubber mastication. The method for producing the listed accelerators is outlined and a characteristic evaluation of these is given. Corresponding disulfides were used as the initial products for producing substituted arylmercaptanes. Both products under investigation were obtained by reacting sulfur monochloride with paratertiary butylphenol and dimethylphenylparacresol. The reaction is given as:

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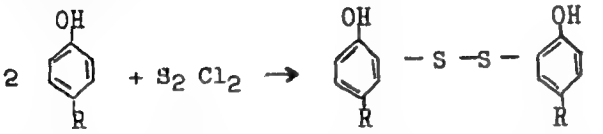
Mastication of Natural Rubber in the Presence of Para-Tertiary Butylphenolmercaptane, Dimethylphenylparacresolmercaptane, Their Zinc Salts and Disulfides



where R is the tertiary butyl- or dimethylbenzyl. The reaction was carried out in a solution of dichloroethane at its boiling point. Sulfur monochloride was added gradually, mixing for 2 hours. At the end of the reaction the dichloroethane was distilled off and the product obtained dried in a vacuum at a temperature of 40-50°C until a constant weight was achieved. The disulfide yields were 82 and 87% of the theoretical, respectively. The obtained products, which were resin-like substances, were subjected to an elementary analysis. The results were: for

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Mastication of Natural Rubber in the Presence of Para-Tertiary Butylphenolmercaptane, Dimethylphenylparacresolmercaptane, Their Zinc Salts and Disulfides

	C	H	S
$C_{20}H_{26}O_2S_2$			
calculated	66.26	7.23	17.68
found	66.67	7.36	17.02
$C_{30}H_{30}O_2S_2$			
calculated	74.07	6.17	13.16
found	74.40	5.99	12.81

The results showed that the synthesized substances correspond to disulfide of paratertiary butylphenol and disulfide dimethylphenylparacresol. In order to obtain corresponding mercaptanes from the disulfides the reduction method was used with glucose and alkali hydroxide in an alcohol-aqueous medium (Ref. 3). Results of an analysis of the zinc content in the zinc salt of the corresponding mercaptane proved that sodium mercaptide and not phenolate is formed when reducing the disulfides with glucose and a calculated quantity of alkali hydroxide. The mercaptane yield was 90 and

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A051/A029

Mastication of Natural Rubber in the Presence of Para-Tertiary Butylphenolmercaptane, Dimethylphenylparacresolmercaptane, Their Zinc Salts and Disulfides

97% of the theoretical, respectively. Zinc salts of the paratertiary butylphenolmercaptane and dimethylphenylparacresolmercaptane were obtained from the respective sodium mercaptides formed in the process of the disulfide reduction. The yield of the commercial product was 96% of the theoretical. The zinc content for the $C_{20}H_{26}O_2S_2Zn$ was calculated to be 15.2% and found experimentally as 14.7%. The authors point out that they were first to obtain the mercaptanes of the paratertiary butylphenol and dimethylphenylparacresol, their zinc salts and also dimethylphenylparacresol disulfide. A study was carried out of the action of the paratertiary butylphenolmercaptane, dimethylphenylparacresolmercaptane and their derivatives on the mastication of natural rubber. Fig. 1 shows the effect of various doses of mastication accelerators on natural rubber processing on rollers, and Fig. 2 the kinetics of mastication at 100°C. Data on the effect of temperature on the mastication on rollers are given in Fig. 3. The tested substances form the following decreasing series according to

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their effectiveness on the mastication process: paratertiary butylphenolmercaptane, dimethylphenylparacresolmercaptane > zinc salts > disulfides. The greater activity of the mercaptane as compared to the zinc salts, etc., corresponds with data obtained previously by the authors in studying trichlorothiophenol, pentachlorothiophenol, orthobenzamide thiophenol and their derivatives (Ref. 1,2). It was further found that the mastication of natural rubber in the presence of paratertiary butylphenolmercaptane, dimethylphenylparacresolmercaptane, their zinc salts and disulfides is hardly effective on the tendency of the breaker mixtures to scorching, or on the vulcanization rate and physico-mechanical properties of their vulcanizates. The authors state in conclusion that for industrial application only the zinc salts of mercaptanes are of interest, since mercaptanes are toxic and easily decompose when stored, and the disulfides have a resin-like consistency. There are 3 sets of graphs, 1 table and 3 references: 2 Soviet and 1 German.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Scientific Research Institute of the Tire Industry)

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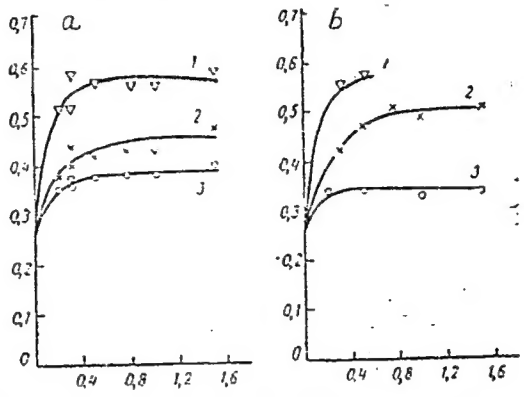

Fig. 1
Vertical legend: Plasticity
Horizontal legend: Dosage of the accelerator, weight parts to 100 weight parts of rubber
Effect of various dosages of mastication accelerators on NR processing on rollers at a temp. of 100°C for a period of 10 min. a-mastication accelerators of the group of paratertiary butylphenolmercaptane 1-paratertiary butylphenolmercaptane, 2-zinc salt, 3-disulfide; b-mastication accelerators of the group of dimethylphenylparacresolmercaptane, 1-dimethylphenylparacresolmercaptane, 2-zinc salt, 3-disulfide.

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Fig. 2

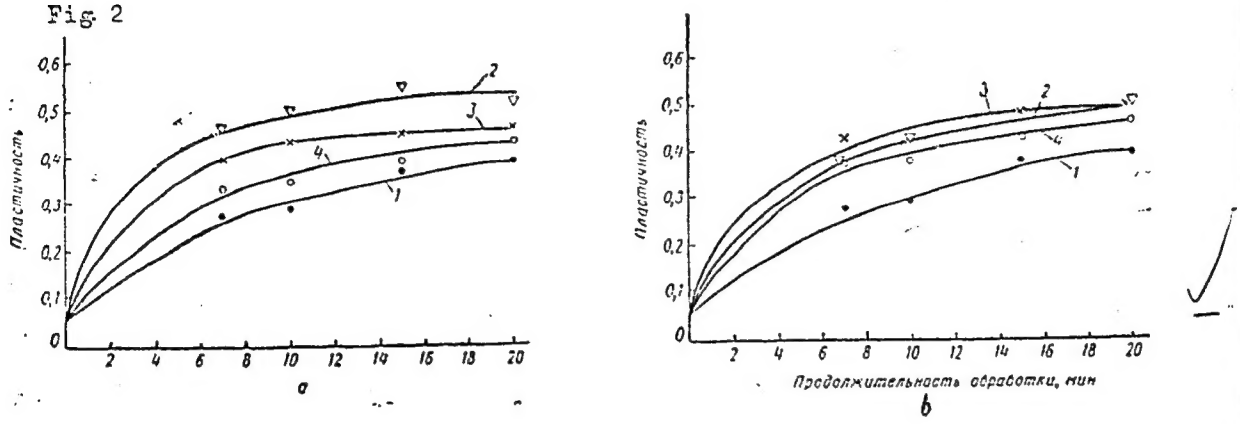

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Fig 2 (continued)
Vertical legend: Plasticity
Horizontal legend: Processing duration, min.
Kinetics of NR mastication on rollers at a temperature of 100°C in the presence of mastication accelerators (dosage-0.3 w.p. to 100 w.p. of rubber):
a-mastication accelerators of the group of paratertiary butylphenolmercaptane; 1-without accelerator, 2-paratertiary butylphenolmercaptane, 3- zinc salt, 4-disulfide
b-mastication accelerators of the group of dimethylphenylparacresolmercaptane; 1-without accelerator, 2-dimethylphenylparacresolmercaptane, 3-zinc salt, 4-disulfide

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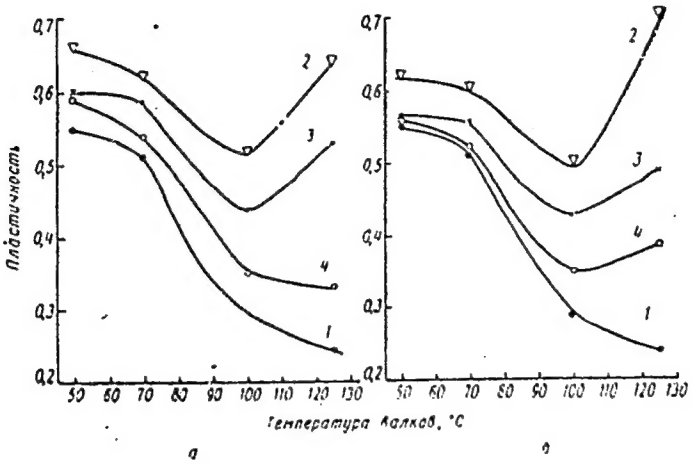
Fig 3



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